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CONTENTS.

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT.

PRESIDENTIAL ADDRESS (Abridged) on the Aims and Boundaries of Physiology. Delivered on Sept. 7th before the Section of Physiology of the British Association for the Advancement of Science. By Sir WALTER M. FLETCHER, K.B.E., M.D., D.Sc., F.R.C.P., F.R.S., President of the Section and Secretary to the Medical Research Council 541

A LECTURE on the Re-education of the Blinded, with special reference to the Blinded Sailor and Soldier. Delivered at Moorfields Hospital. By Sir ARNOLD LAWSON, K.B.E., F.R.C.S., Ophthalmic Surgeon & Lecturer on Ophthalmic Surgery, Middlesex Hosp., &c... 544

A LECTURE on the Part Played by the Endocrine Glands in the Evolution of Man. By Prof. L. BOLK, Director of the Department of Anatomy in the University of Amsterdam and Secretary of the Royal Academy of Sciences..... 588

ORIGINAL ARTICLES.

The Significance of Some Early Symptoms of Nervous Disease. By JUDSON S. BURY, M.D., F.R.C.P. 549

Studies from the St. Andrews Institute of Clinical Research. Preface by Sir JAMES MACKENZIE, F.R.S., Director of the Institute. I. Present State of Medical Knowledge regarding the Diseases Common among the People. By ANDREW ROWAND, M.B.—*(Illustrated)* 551

The Psycho-pathology of Pulmonary Tuberculosis, with special reference to Treatment. By D. G. MACLEOD MUNRO, M.D., M.R.C.P..... 556

The Use of Luminal Sodium in Epilepsy. By J. TYLOR FOX, M.A., M.D., D.P.M. 558

Alpine and Subalpine Climatic Treatment. I. The Place of Alpine Spas in Medicine. By E. BOSDIN LEECH, M.D., F.R.C.P.—II. Switzerland & "Nerves." By S. A. KINNIER WILSON, M.D., F.R.C.P.—III. Swiss Health Resorts for Tuberculosis. By A. NEVILLE COX, M.D., M.R.C.P.—*(Illustrated)* 574

CLINICAL NOTES:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

Purulent Pericarditis Simulating Angina Pectoris. By M. A. CASSIDY, M.D., F.R.C.P., R. O. MOON, M.D., F.R.C.P., and F. LE Q. PELLY, M.B., B.Ch.... 559

Note on Early Progress of an Infant of Abnormally Small Weight. By F. CHURCHILL DAVIDSON, M.B., Ch.B., D.P.H.—*(Illustrated)* 559

A Case of Bullous Eruption caused by May-weed. By J. H. SEQUEIRA, M.D., F.R.C.P., F.R.C.S.—*(Illustrated)*..... 560

A Case of Congenital Absence of Right Pectoralis Major. By A. G. MILLOTT SEVERN, M.D., M.R.C.S., F.C.S. 560

REVIEWS AND NOTICES OF BOOKS.

Surgical Therapeutics and Operative Technique. By E. Doyen..... 561

Dante. Essays in Commemoration. 1321-1921 561

The New Stone Age in Northern Europe. By John M. Tyler 562

The Chemistry of Enzyme Actions. By K. G. Falk..... 562

The Chemistry of Synthetic Drugs. Third edition. By Percy May, D.Sc., F.I.C..... 562

The New Methods of Blood and Urine Chemistry. Second edition. By R. B. H. Gradwohl, M.D., and A. J. Blaivas 563

Aids to Operative Surgery. By H. C. Orrin, O.B.E., F.R.C.S. 563

X Ray Diagnosis. By Dr. Herbert Assman 563

A Manual of Bacteriology, Clinical and Applied. Seventh edition. By R. Tanner Hewlett, M.D., F.R.C.P., D.P.H., F.R.M.S. 563

Human Embryology and Morphology. Fourth edition. By Arthur Keith, M.D., F.R.S., LL.D., F.R.C.S..... 563

Addresses on Psycho-Analysis. By J. J. Putnam, M.D..... 564

Concept of Repression. By Girindrashekar Bose, D.Sc., M.B. 564

Psycho-Analysis, Sleep and Dreams. By André Tridon 564

Repressed Emotions. By Isador H. Coriat, M.D..... 565

The Wassermann Test. Second edition. By Charles F. Craig, M.D., M.A., F.A.C.S..... 565

The Spleen and Some of its Diseases. By Sir Berkeley Moynihan..... 565

Lectures on Surgery to Nurses. By Alan H. Todd, B.Sc., M.S., F.R.C.S. 565

Journal of the Royal Army Medical Corps..... 565

Parasitology 556

NEW INVENTIONS.

A New Tracheotomy Tube and False Membrane Forceps (Dr. A. Cubley).—*(Illustrated)* 566

LEADING ARTICLES.

THE BRITISH ASSOCIATION AT EDINBURGH..... 567

THE PATHOLOGY OF WAR NEPHRITIS 568

AN APOLOGY FOR SPAS..... 568

ANNOTATIONS.

Lighting in Kinema Studios .. 569

A Controversy on Industrial Accidents..... 570

In Defence of the Bacillus Bulgaricus..... 570

Outlook for Physical Research 570

Ocular Reactions in Anaphylaxis 571

The Influence of Arsenical Preparations on Cutaneous Tests 571

Silver Salvarsan..... 571

Pott's Disease in Adults 572

The Choice of Dental Anæsthetics 572

The Regulation of the Reaction of the Blood..... 572

The Refractory Iris 573

Keratomalacia in Rats..... 573

The Treatment of Sleeping Sickness 573

THE SERVICES.

Royal Naval Medical Service 574

Royal Army Medical Corps.... 574

Royal Air Force 574

PUBLIC HEALTH SERVICES.

School Medical Service: Sheffield, Northampton, Nuneaton 581

Annual Reports of Medical Officers of Health: Salford, Ilford, Chelmsford, Herefordshire 582

SPECIAL ARTICLES.

Metropolitan Asylums Board: A Comprehensive Report ... 590

Ireland..... 593

The Grosvenor Telephone Exchange: Medical Men's New Numbers 593

CORRESPONDENCE.

Hydrocyanic Acid and Sanitation (Dr. Charles Porter)..... 593

The Natural History of Encephalitis Lethargica (Dr. H. Willoughby Gardner)..... 594

The Swimming-Bath and Ear Infection (Dr. Dan McKenzie) 595

A Disclaimer (Mr. Beckwith Whitehouse) 595

Late Effects of Gassing or Tuberculosis? (Dr. J. E. Spence) 595

Early Diagnosis in Diphtheria 595

MEDICAL NEWS.

U.S.A. General Hospitals and T.B. Patients..... 543

Donations and Bequests 551

A New Hospital at Colne..... 569

Guy's Hospital Biennial Dinner 580

North-East London Post-Graduate College 580

Free Milk in Infant Welfare Centres..... 586

Epsom College..... 586

The late Dr. R. W. Allen 586

The late Dr. A. J. MacCallum 586

The late Dr. Alfred Macpherson 587

The late Dr. T. H. Morton..... 586

Wigan Infirmary..... 587

Presentation to a Medical Man 587

Drugs Needed in Russia 587

Visit of Swiss Medical Students to Vienna 587

Winsley Sanatorium..... 587

NOTES, SHORT COMMENTS, &c.

Medical Congress at Yverdon 592

An Exaggerated Report 592

The Old "Impregnable"..... 592

Another Consumption Cure in the Lay Press..... 592

A New Procedure in Obstetrics 592

Medical Diary 587

Appointments 587

Vacancies 587

Births, Marriages, and Deaths..... 588

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Presidential Address

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ON THE

AIMS AND BOUNDARIES OF PHYSIOLOGY.

Delivered on Sept. 7th before the Section of Physiology of the British Association for the Advancement of Science.

BY SIR WALTER M. FLETCHER, K.B.E., M.D., D.Sc. CAMB., F.R.C.P., F.R.S.,

PRESIDENT OF THE SECTION AND SECRETARY TO THE MEDICAL RESEARCH COUNCIL.

UPON the occasion of our meeting in this metropolitan city of Edinburgh, the seat of an ancient university and a great centre of medical study and practice, it has occurred to me that it may be profitable for us to consider the part which physiology should rightly take in its relation to national life, to learning, and to medicine. Not only the place of our meeting, indeed, but some special circumstances of the present time seem to make it fitting that we should here review the progress, the proper scope, and the prospects of our chosen subject. We are now just half a century from the time when physiology first came to take its present position in this kingdom as one of the great branches of university learning and as a vital part of medical education. We have seen the close of a war which, though it diverted and distorted the progress of the science, yet brought it great opportunities of service in national life and taught us lessons, here as in so many other directions, of which we shall do well to take profit. The passing of the war, moreover, has brought a period of change and unrest during which impulses towards reform are being chequered by the results of fatigue or reaction. Both here and in America it may be said that, while physiology has come from the war with enlarged outlook and responsibilities, it is exposed to some new and perhaps dangerous influences in the present time of rapid resettlement. It may well be worth while, then, to look now both forward and back, to see the road by which we have hitherto been led and its relations to that which now lies before us.

[The lecturer then sketched the rise, shaping, and establishment of physiological knowledge during the past 50 years, through which period England led the rest of the continent in experimental results and in new ideas. After brief reference to the developments which followed Harvey's discovery, he pointed to University College, London, as the home of modern physiology, and to the great Sharpey as its father. He showed how Sharpey, in touch with the best progress in France and Germany, organised the study of physiology between 1836 and 1874, and he made sympathetic reference to the aid of the Prince Consort, who was familiar with continental progress. The work of Sharpey in its original home, he said, had been continued by Starling, Bayliss, and their colleagues, while from Sharpey's school were derived the sturdy branches of physiological study which have borne fruit at Oxford under Burdon-Sanderson, Gotch, and Haldane, and at Cambridge under Michael Foster, Langley, Gaskell, Hopkins, and Sherrington, who has now transferred his services to the sister University. In his consideration of the work of all these pioneers, Sir Walter Fletcher was able to show that from British experimenters have come the root ideas in nearly all the great primary fields of physiological knowledge. He gave as examples the nature of the heart beat, modern conceptions of the central nervous system, the analysis of the functions of the sympathetic system, and the detailed study of nutrition and respiration. Sir Walter Fletcher also pointed out that at no time earlier than the war had the British physiologists either the menial assistance or the other resources which their colleagues abroad had commonly commanded. He then proceeded:—]

LESSONS OF WAR EXPERIENCES.

Before 1914 physiology was being developed, as we have seen, in its still youthful status as one of the primary departments of knowledge; it had become a subject of independent university rank. Large and important parts of this development had proceeded at one or other of the ancient universities, out of touch with great centres of population, and out of touch, therefore, with immediate medical needs. In some degree this was not without advantage, and for two main reasons. Detachment from the pressure of need allowed the free pursuit of knowledge for its own sake and a full surrender to the hintings of nature, wherever her clues might lead the inquirer. Experience amply showed, moreover, that when physiology was presented among other university subjects for study it gained, first as recruits and later as distinguished workers, many able young men who were attracted to it, often from other subjects, by the fascination of its problems, and without regard to any of its potential applications to medical or other practical ends. These were great gains which it would be easy, if it were not unnecessary, to illustrate by many convincing examples. Yet there were some heavy counterweights on the other side of the balance. The practical and urgent needs of humanity as found at the hospitals were not brought with full or due effect to the notice of physiologists. Those in charge of hospital patients were not selected to advance, or habitually engaged in advancing, medical knowledge, and new physiological conceptions as they took shape in our laboratories only slowly and partially came to have effect in medical practice and medical study. The physiologist, to his own certain loss and to the no less certain loss of medicine, held aloof from the bedside, often when access was possible, and remained immersed in his laboratory interests. Little pressure, indeed, was ever brought to bear upon him by the physician to come to his aid. Connected with the evils of this separation was the divorce which the accidents of development had set up between physiology and pathology, as though the study of the damaged body could be separated from the science of the living organism and of its reactions to disturbance from the normal. Yet, while the physician had come to tolerate the approach of the pathologist to the bedside, it occurred too rarely that he felt the need of the physiologist, or made himself familiar with new devices of physiological investigation.

If from a hospital in time of peace the most obvious call had seemed in the past to come from the side of infective disease or morbid process for the help of the pathologist, in war the stresses put upon the healthy human body made the physiologist and his methods indispensable. Bacteriological work and studies of immunity had their prominent place, of course, in the detection and prevention of infective disease, and wonderful were many of the achievements seen under this head. But in a sense the more complete the prevention of infective disease the more apparent became the physical stresses of war. The violences offered in modern warfare to the human body—whether through exertion and exposure, by terror or excitement, in physical damage by lead or steel or in chemical attacks by poison, and not least through the incredible stresses of flying high and fighting in the air—all these brought many new and urgent calls for precise physiological knowledge and for new studies by the physiologist. The results of pain and fear, of hæmorrhage, of "shock" by wound or operation—all these needed further analysis before sound treatment could be devised or improved. New studies were needed of changes in blood pressure and blood volume and in the qualities of the blood itself, new inquiries into the finer vessels of blood circulation and their relation to the nervous and other systems, and new analyses of the chemical mechanisms of the body and of the modes by which want of oxygen is met by

adaptation or leads to final damage. But the well-nigh incredible demands made upon the machinery of man's body in and behind the battle-line, in all situations upon the land or under the earth, high in the upper air, in the sea or within its depths, by no means make up the tale. Our forces were engaged in every climate, from the Equator to the Arctic regions, and were faced by innumerable local or accidental variations of diet. Here again were required the applications of physiological studies of heat loss and of heat production to manifold practical problems of clothing and of diet. What would have seemed a fanciful fairy tale barely twenty years ago might in particular be told of the miracles wrought by the studied application of our knowledge of vitamins in diet, in saving from painful disease or death many thousands of men in diverse climates and fields of war.

LESSONS FOR CIVIL LIFE.

At home the bodies of the civilian population were exposed to many stresses, often hardly less than those of active service. Men and women alike were exposed to arduous toil, to dangerous occupation, to poisons of many kinds needed for munitions, and in all these dangers the guidance of the physiologist was needed for the avoidance of industrial fatigue and loss of output and for devising protection against industrial poisoning. The whole nation was threatened by the menace of starvation, and our escape from that, itself one of the governing conditions of our ultimate victory, was due to a system of rationing and of the management of food materials, animal and vegetable, which was based on accurate physiological knowledge, won by experimental methods.

I touch on these points here briefly and in outline only in order to draw attention to the special influence which, as I think, the war has exercised upon the position of physiology in this country. The physiologists gave no exceptional help to the nation during the war; the exponents of every branch of science were needed, were ready, and were used, in our national crisis. Hardly one division of science can be named the deficiency of which would not have made defeat inevitable. It is a truism and a commonplace to say that no bravery and no fortitude could have avoided defeat without the help of scientific men and of the fruits of experimental science, though that commonplace has not, I think, ever yet been enshrined in the addresses or thanks of Parliament or in the prayers and thanksgivings of our churches. But we may recognise, perhaps, that the nation as a whole, and those especially who have the government, public or private, of large groups of men in their hands, have learned that obedience to physiological law is a first necessity for the maintenance of the body machinery in health and for its effective and harmonious use. They have come to know, moreover, that the men who alone can guide them to this obedience are those who have learned in the school of investigation from nature herself. The nation has seen a minister fall whose control of the people's food was not based upon physiological law, and his successor gain renown whose adoption of the teaching of physiological experiment was early and faithful. Nor was this by any means an isolated object-lesson. There is no doubt, surely, that physiologists have a new vista before them of immense public usefulness, if they will hold themselves in readiness to give the same kind of service to the country in the stress of her industrial life during peace as they gave so freely and to such effect in time of war.

LESSONS FOR THE PHYSIOLOGIST.

But if the war brought these lessons to the general public, what lessons have come from it to the physiologist himself? I would only recall briefly here the considerations which were brought home with sufficient clearness to us all, I think, during and after the closing stages of the struggle. The war, in the first place, displayed before us new and gigantic fields of physiological study. Viewing these so far as we can, even at this distance, dispassionately, we see how the stresses and accidents of warfare in all their variety offered to our study a series of experiments made upon the human body, and on a gigantic scale. Only by disciplined study of the results at all stages of these trials of war in all their varying degrees of horror and distress could effective aid be given in palliation of suffering or its avoidance. It was inevitable that study of this kind and upon so great a scale should result—as, happily, it did result—in much permanent gain to physiological knowledge and to the beneficent power that all sound knowledge brings. New insight was given into the functional patterns of the nervous system and into the orderly hierarchies, so to speak, under which this or that function is brought into subordination to another of superior rank, and new knowledge was gained of the phenomena of separation and repair in the outlying nerve trunks. Accurate information was collected of the nutritional needs, quantitative or qualitative, of human beings under varying conditions; and, in particular, many special conditions of warfare brought to the test, established the fundamental usefulness, and stimulated the growth of that newest chapter in physiology already mentioned—that dealing with the elusive but potent accessory factors in nutrition—the vitamins. These examples must suffice where scores of others familiar to all of you might be given.

In the second place, the experience of the war has had wholesome effect from its tendency to remove the barriers that here and there had grown up between physiologists and the practical needs of medicine. Physiologists had valued, and justly valued, their academic freedom of inquiry within the universities, and, indeed, we know that practical utility could not be better served in the long run than by the detached pursuit of knowledge for its own sake. But, partly for reasons of hospital and professional organisation already touched upon, and partly because, to its obvious and immense gain, physiology had attracted from other paths men who were not, and had never become, medical men, there were some capital parts of the subject of which the chief explorers had never used the medical field of work or brought to medicine the weapons they had, perhaps unwittingly, at command. We can recognise already that this partial divorce has been changed by the war into a union likely to be increasingly fertile. Of the professorial chairs of medicine or directorships of medical units established since the war, for the advance of medical knowledge within hospitals in accordance with the university standards and ideals acknowledged in other subjects of study, it is remarkable that to the greater number of these there have already been appointed men whose training has been in the methods of the physiological laboratory, and who applied that training to urgent medical problems of the war. There is hardly any one of our schools of physiology, moreover, to which some piece of living experience has not been brought in these last years to enforce the old lesson of the value to science itself of bringing natural knowledge to its fullest utilitarian applications. The practical fruits of scientific labour are found, if our hands are put out to gather them, to contain within themselves, like the natural fruits of the earth, the very seeds from which new knowledge and new fertility will spring. Many of our leaders in physiology brought to the problems of war the accumulated knowledge of their lives, as patriotism and humanity dissolved at a touch the hedges of custom and use. I know of not one such who did not find in the application of his vision and training to the actual problems before him, first, a wholesome reminder of the limits of his knowledge and its clarity, and, second, new clues towards its advance, and that by no means only in a familiar or an expected direction. The stimulus of practical need here, as so often in experience, advanced the growth of knowledge beyond the point of immediate application to practice. Those who studied to find the best and most practical means of saving life threatened by severe hæmorrhage, or by the shock of wounds or operation, found in the course of meeting the immediate emergencies almost endless

promptings to further inquiries, to be followed then or later—inquiries into the physical, chemical, or biological qualities of the blood, into its relations to the vessel walls, and into the functional changes of the capillary blood system and the factors affecting or controlling them. Those who fixed their attention upon the damage wrought in the respiratory organs by poison gases were led to many new studies of the fundamental physiology of the lungs. The lymphatic system of drainage of the lungs was re-examined, and wide new experimental studies of the modes of regulation of the breathing were undertaken which have thrown new and valuable light upon the normal mechanisms of respiration. An inquiry into the poisonous action of the high-explosive trinitrotoluene, and into the possibility that slightly abnormal forms of this substance, found as a small contamination of the normal form, might be specially toxic, led to a clear negative answer. But it led unexpectedly, it is both curious and useful to note, to the discovery that one of these abnormal forms was an effective reagent in the laboratory. By its means the chemical structure of a constituent of muscle substance known as carnosin was for the first time determined, and carnosin has now been synthesised artificially from simple materials.

In sum, then, we may gratefully recognise that the war in its horror and waste has not brought evil without admixture of good. We may be encouraged at least to hope that the active coöperation which the war established and fostered in diverse ways between the physiologist and the medical or surgical clinician may remain to bring lasting good, on the one side to the cause of learning and its advance, and on the other to medical education and to medical progress.

SYNTHETIC CONCEPTIONS.

[In the third section of his address Sir Walter Fletcher invited his audience to review the aims of physiology and the boundaries to which it should properly extend in its relations to other subjects of study. He said that the analysis of the separate functions of each part of the body showed an inevitable mental process, as the anatomist revealed more and more accurately the visible machinery of the body. But the pursuit of knowledge by particular technical methods had led to specialism, new named sciences growing up within the old. Step by step with progress in analysis there had been continual advance towards synthesis. Of this absorption of analytic data into synthetic conceptions he gave examples, dealing with the discovery of the hormones, recent additions to knowledge of the brain and spinal cord and of the functions of the various systems of fibres and cells involved, the analyses of the biochemist and the discoveries in the modes of regulation of breathing.

He closed this part of his interesting address with the following words of warning :—]

In the rapid growth of medical schools throughout the English-speaking world there are present signs that the essential part which physiology plays in medical education and study may wrongly masquerade as the only service physiology has to give to man, and may appear to fill the measure of her rightful status. In more than one of the great American universities physiology is treated either in theory or in practice as a subject within the Medical Faculty to be housed within the medical school, yet at the same time not as a subject in the Faculty of Arts or of Science, nor to be studied alone or with other sciences as part of a liberal and non-professional education. It is rare in the United States for physiology to be studied by any but professed medical students, and there is some reason to think that it is becoming rarer in Great Britain than it was a few years ago.

To my mind this tendency is to be deplored. It implies a reversal of that growth of physiology in freedom which began half a century ago and from which such good fruit has already been gathered. It has two chief evils among its inevitable results. Removed from its position among other university subjects by geographical separation that in some universities amounts to transportation and exile, it is deprived of the kinship and coöperation of the sciences touching its own boundaries—those of zoology, embryology, and botany, of agriculture, of psychology, of physics and chemistry. Assigned, if not limited, to a place in the medical curriculum, it is apt to be narrowed in its claims and outlook, and to lose not only its proper neighbours, but even parts of itself, whittled away in the organisation of a purely medical programme in the guise of pharmacology, neurology, toxicology, and the like, for which special funds may be available, separate places in the time-table reserved, and independent departments provided. But a second evil strikes more deeply. Any arrangements that give in effect a restriction of physiological studies to medical students alone must be doubly injurious. It is injurious to the general course of education, because it tends to cut away from the other university students the opportunity of possessing themselves, either as a primary or secondary study, of the knowledge and discipline of physiology which has educative value in the highest degree for the cultural or the practical sides of living. And here, secondarily, we may notice the loss to an applied study only less in importance to that of medicine ; I mean the science and practice of agriculture. It is injurious, again, to physiology itself, because we know well from reiterated experience how many promising recruits for the future advancement of the subject have been brought to it, often, as it were, by chance, in the course of their university life, attracted to it whether from classical studies or mathematical, or from other branches of natura science. A notable number of the chief leaders in the science of the past and present generation have so been attracted, without any previous thought of medical studies as such, whether these have been added later or not ; of these leaders, not a few whose names are well known to us all have never become, in the technical sense, students of medicine at all. They may have lost by this, but should we willingly have lost them ?

I hope that what I have earlier said with regard to the great service that physiology has both to give to medicine and to receive from it will acquit me of any charge of desiring less, rather than much more, intimacy and intercourse between them. I believe that no better service can be done for the good of both than to increase their mutual offices and the ties between them. But we must see that, in uniting physiology to medicine, we do not uproot it from that soil in which alone it can abundantly flourish and bear fruit, the environment of a university with all that that connotes. If there be any serious doubt of the reality of the dangers I have indicated, I would point to the dearth of men fitted to promote and teach the subject among those coming from the schools in which physiology is regarded as a medical study and no more, and is not given its full university status. In the United States at present there is a grave and admitted dearth of suitable candidates for chairs of physiology, in spite of the remarkable work which has been done there in recent years and the fine material equipment in general available. I venture to offer my conviction that the prime cause of this shortage is the absence of the great recruiting possibilities of university life and the undue limitation of physiology to medical students. Men coming to physiology as a " preliminary subject " and nothing more are not likely to think of it as their life-work, but will pass through it not to return.

[In conclusion, Sir Walter Fletcher referred briefly to the high intellectual and æsthetic sanctions of physiological study.

U.S.A. GENERAL HOSPITALS AND T.B. PATIENTS.—The United States Public Health Service in a recent bulletin regards the opening of the general hospitals to tuberculous patients proposed at the Boston annual meeting of the American Medical Association as a step in the right direction. This hospitalisation will, it is believed, be largely preventive and in line with the medical tendency of the day to look to prevention instead of to cure.

A Lecture

ON THE

RE-EDUCATION OF THE BLINDED,

WITH SPECIAL REFERENCE TO THE BLINDED SAILOR AND SOLDIER.

Delivered at Moorfields Hospital

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THE problem of educating a child born blind and that of re-educating one blinded after the usual period of education has passed are two totally different matters. The former, broadly speaking, consists in finding some method by which the lack of one sense can be supplemented by extra training of the remaining senses. Thus a child who is born blind and has never seen a bird can be taught to appreciate the shape and characteristics of birds by the demonstration and handling of stuffed birds and models. All the intellectual faculties can be brought into play by side-route methods. Observation and concentration, the two most important desiderata of education, are developed by exercise of hearing, touch, and memory, whilst the expression of ideas by reading and writing after the blind methods are fairly easily acquired by the blind child of average ability when instructed by specially trained masters and mistresses.

For one who has already been educated on the lines of a sighted child, re-education after blinding is a problem of much greater difficulty, and previous to the recent war attempts to deal with it were incoördinated and unsatisfactory. A young adult blinded by accident or disease might ultimately learn to read Braille with facility—probably he did not. There were several most estimable societies devoted to the relief of such cases, but they, for the most part, worked by money grants and pensions, although others did excellent work in the maintenance of workshops, where the blinded could learn the trades of brush, mat, and basket making. It was not always an easy matter to get a person into these workshops, and if the person did not feel inclined to go there no moral pressure was applied. If the blinded boy or girl preferred to sit by the fire most of the day doing nothing, or to be led about the street playing a penny whistle or chanting some doleful ditty or hymn, or perhaps turning the handle of a piano-organ, there were few to say nay or to make any special effort to turn him or her into a useful member of society.

The rapid influx of men blinded in the war from its very commencement brought the problem of the re-education of the blinded very keenly to the fore. St. Dunstan's Hostel, the biggest work of private enterprise that the world has ever seen, has shown what can be done and how it can and should be done, and it is to the methods of training as exemplified by the work of St. Dunstan's Hostel that I intend specially to direct your attention to-day.

But before discussing methods of re-education let us see what are the special difficulties. In the first place the patients have already been educated through and by means of the eyes. Re-education means in fact commencing all over again on different lines at a period when maturity has been reached and the natural receptiveness and plasticity of the childish intellectual response to training is over. The child who is congenitally blind is much better off than the blinded adult. It cannot miss what it has never experienced, and all its faculties are trained easily enough to supplement what it lacks. In the case of the blinded man, the intellectual senses have been, to a very large extent, dominated by the eyes, and subservient to them. It is true that he has gained a very great deal by the experience won by means of his sight before it was lost; but the losing of it reacts against him in that he can no longer put his experience to the test of the eyes on which he was accustomed to rely. The blind child has never gained this experience of the eyes, but intuitively seeks to gain experience by other methods which come naturally to it, but which are totally unnatural to the sighted child.

DIFFICULTIES OF RE-EDUCATION.

That is the first great difficulty—the having to re-educate on totally new lines—and it becomes of increasing significance according to the patient's age, which is the second difficulty. For as we live and get older each one of us gradually becomes at first fixed in our methods of action and habits of thought, and then gradually less capable of absorbing fresh ideas, and less willing to try to absorb them. Thus we see that the re-education of a blinded person is only possible for a certain period of life. After that time has passed we must be content with an incomplete and increasingly inefficient result from our efforts. As we say at St. Dunstan's, the man is trainable or untrainable, and the former class should theoretically, though, alas, not practically, embrace all cases blinded up to the age of 40. From the age of 40 to about 50 years there may be a certain amount of effective re-education, but the amount gained by the patient is not in proportion to the effort made, and after the age of fifty, with the exception of a few who in the past have been highly intellectual, the re-education resolves itself in most cases to providing the patient with methods by which he may serve to pass the time pleasantly. The learning of Braille is a good instance of this, and it is found practically useless to instruct in this subject when the patient is over 40 years of age, though there are exceptions. The patient may master its technicalities at a much later age than 40, but it is rare to find one, who, commencing after this age, becomes sufficiently conversant with it to read Braille with real facility and with genuine pleasure.

The third difficulty is presented by the patient's individuality, which is a factor of enormous importance. It is very disappointing trying to re-educate a country bumpkin who has successfully resisted efforts to educate him when he had his sight. Such a one has passed the best educational time with his intellectual vision almost entirely subservient to the practical necessities of obtaining sufficient to eat and drink by unskilled labour. Only the simplest forms of re-education are applicable to such a man, although he may have attained manhood but a very short time, and even such simple training as may be applicable to his case may be extremely difficult to instil. On the other hand, a man who has received and proportionately absorbed the benefits of a good education in the past, may, under certain conditions, be capable, after he has been blinded, of resuming his usefulness as a citizen to as great or even greater extent than that to which he attained before blindness overtook him. Of that fact we have had many notable examples in history, and in most recent times the names of Arthur Pearson and Towse will go down to posterity as examples of what a blinded man can achieve. However great these two men were in their sighted life, whatever power of achievement might have been theirs had they retained their sight, the fact remains that their great services to their fellow men followed on their blindness, and that what the world would have called their disablement has proved their glory.

Thus it is seen that the re-education of the blind man must be conducted on individual lines, varying with the person. It is not possible satisfactorily to educate every child, blind or not, on the same individual lines, though it is constantly being attempted and is the one great difficulty of school life, but it is even less possible in re-education because the dominating individual characteristics of a grown man are infinitely more dominating than those of a child, and whereas it is possible to turn a child away from its

natural inclinations, it is generally not so possible in an adult.

The last great difficulty is one which is not constantly present but which may prove a great stumbling block. It is the mental attitude of resistance of some blinded persons towards attempts to re-educate them. I think it exists temporarily in almost every case as a natural sequel to the first losing of the sight. The sudden plunging of the sighted man into darkness by the havoc of a shell-burst or bullet must be, and is, followed by a period of mental depression, often of a most acute character, which persists in many patients for a long period. The shorter this period can be made the happier for the patient, but while it lasts the patient is apt subconsciously to resist any effort to ameliorate his position. The younger the patient the more easily and quickly will he usually react to outside influences to help him, but in the case of people who are blinded in the evening of their lives it is not unusual to find a persistent passive attitude of inability to take interest or to attempt to make the best of circumstances. Of course, when a patient has gradually lost vision by the progress of some insidious disease, the ultimate catastrophe, delayed perhaps for several years, loses the greater part of its horror—the patient has had time to become acclimatised as it were. It is the *sudden* or rapid loss of that upon which the beauty and enjoyment of life seem to hang, which causes the persistent melancholy from which so many old people fail to arouse themselves. Believe me, it is a far better thing to lose the sight in the spring or summertime of youth than in the autumn or winter of life. The natural sympathy of the world is for the blighted prospects of youth; all the might-have-been of life seemingly so utterly destroyed, the future so hopelessly dreary. After all, the elderly or old man has had his time of youth unblasted by blindness—not so many years of life still remain, and though blindness is always hard he cannot win the same intensity of the world's sympathy as the young blinded man. And yet the world is wrong. For one of the great blessings of youth is its inability as a rule to look too far ahead. Foresight is largely a matter of experience won by age, and youth is always ready and usually capable of reclaiming and retying the threads of life which have for a time parted and separated him from most of what makes life lovely and pleasant. An old man generally cannot pick up the threads at all; or if he can find them he cannot tie them correctly—he is confined by his experience and his powers of outlook. He cannot start all over again—it is too late to do so even if he were to try. The old man is in fact, as I have already pointed out, untrainable.

It was this spirit of youth that was the chief asset in the production of that wonderful cheeriness which so pervaded St. Dunstan's during the war, and so astonished all who went there. The society of comrades similarly maimed helped in a very great measure, but neither the society of comrades nor the sympathy and help of all who worked at St. Dunstan's would have brought that laughter and that brightness if St. Dunstan's had been peopled by old men instead of boys, as there they mostly were.

CATEGORIES OF BLINDNESS.

For the purposes of training, a man may be defined as blind when his sight is so bad that he is unable to earn an independent livelihood as a sighted man can do. Thus the blind can be divided into three categories or classes: (*a*) those who have completely lost their sight; (*b*) those who still retain fragments of vision but no useful sight, their powers being limited to bare light perception or to some sense of form or movement over the whole or part of their visual fields; and (*c*) those who still possess some useful sight, vision that enables them to get about without aid and to recognise large objects close at hand, but insufficient to enable them to earn their living as sighted men. This latter class, as we shall see later on, embraces the most difficult cases for training purposes, because it generally happens that a patient cannot be taught to learn without using the weak sight that is still retained and which is thereby very frequently endangered by the instinctive straining set up. Class (*a*) is the most satisfactory of the three, for those who have completely lost their sight most quickly become resigned and most easily are taught to do without it, and indeed fragmentary vision is of positive harm to many in that it gives no real comfort but rather tends to confusion and to increase the difficulties. I have often heard patients say that they were worried by the retention of a little sight in one or two corners of the visual field, and similarly have heard others rejoice when they had lost it. It was well recognised at St. Dunstan's that the completely blind were the easiest to train, and our experience there was that these were the most contented of the patients, and that grumbling and discontent and other little troubles, generally present in any community, seemed chiefly to emanate from those who still retained a little sight.

PRELIMINARY RE-EDUCATION OF THE MORAL SENSE.

Now before re-education in the sense of intellectual or manual instruction can be satisfactorily commenced there must be a re-education of the patient's moral sense. When sight is first lost the patient is plunged into an intellectual abyss from which there seems no way of escape. He finds, or fancies, himself completely dependent on others for everything. He cannot walk, eat, or amuse himself, and his every action seems to necessitate an appeal for help. He may at first try to be independent, but probably soon gives up such apparently futile efforts; he tends more and more to lose his sense of individuality and to rely entirely on the sympathetic help of those about him. The very first step in re-education consists in teaching the patient to recover his lost independence and to regard his difficulties not as disabling, but as inconveniences which can largely be discounted. That is one of the great secrets of the success of St. Dunstan's, for there the patient, removed from the environment of sympathising relatives and friends, only too willing to do all for the sufferer, whilst the sufferer gradually becomes entirely willing that all should be done for him, is brought into the midst of a large community where all are experiencing similar difficulties and learning to overcome them. The association of comrades in blindness, all of whom are there for the same purpose—viz., the overcoming of difficulties, combined with the companionship of teachers who help in the overcoming of them, soon begins to react on the patient, who finds out that all is not lost to him. With that feeling of reaction comes the desire to try to do what he can to help himself, and as soon as that advance is made the progress will be rapid. I think the experience of the last six years has shown conclusively that colleges or communities for the blind are the first essentials in re-education. It is not possible satisfactorily to train the blind by private instruction or by directly depositing them in workshops. Prior to everything else must come the learning of independence.

INITIAL TRAINING AT THE HOSTEL.

The patient having arrived and settled down at the hostel soon finds that while all are ready to help him it will be greatly to his advantage to help himself, and practical aids to do so are the next essential preliminary. Thus to enable him to find his way about the building narrow strips of carpet, the edges of which can be detected by the stick with which each blind man is provided, are laid along rooms and corridors, and handrails, where necessary, afford further help, whilst stairs are indicated by patches of rubber or wood which the feet instantly detect. With these aids the man rapidly acquires confidence in walking alone in places and buildings which he has learnt to know, and will soon progress with almost the same ease and confidence as the sighted man.

Feeding neatly has also to be learnt, and the patient will with some practice attain a proficient

use of knife and fork when he finds out that this is expected of him, and that he is not allowed to be spoon-fed like a baby, a habit that the blind rapidly acquire if left to themselves. Of course a certain amount of aid at meals is essential, such as the removal of bones of fish and so forth, but nothing is worse for the patient, and so contrary to the spirit of independence, than hand-feeding by another person.

Then, again, the patient must regain interest in his personal appearance—the neatness and cleanliness of dress and appearance. Both these qualities have to be guarded by outside aid; the blind, if left to themselves, very speedily become indifferent to these points and slovenly in their habits. Shaving is easily taught and the patient quickly learns also to interest himself in the appearance of his clothes, his finger-nails, and the neatness of his general turn-out, especially when he is one of a community where these points receive attention and excite comment.

USES OF SOCIAL INTERCOURSE.

The social intercourse which is one of the great advantages of a community, will soon react on his attitude to outside affairs. He will begin to be less engrossed by his own misfortunes and to take more interest in what is going on round him. He will come in contact with others more advanced in re-education, whose experiences will prove of interest, whilst the knowledge of their difficulties similar to his own, and overcome, will stir in him the spirit of emulation to succeed himself. The old contemptuous proverb about "the blind helping the blind" is one that should be cut out of the wise sayings, for in very truth we know that the blind can and do help the blind, and that nothing is more helpful to the recently blinded man than the experiences of one who has gone through the mill himself and gained the victory. This was one of the special good works of Captain Towse in the war, and often have I heard of the comfort he brought to the bedsides of those who were sunk to the lowest depths of despair by the loss of all that seemed to make life worth living.

The advantages of social life are further exemplified by the relaxations, distractions, and amusements which are possible in a college for the blind. The greatest importance was attached to this side of re-education at St. Dunstan's, and rightly so. Firstly it is difficult for a blind man, especially if he is young, to obtain the physical exercise necessary to good health, unless he is specially taught; and, further, such exercise not only interests and amuses, but it educates as well; for it teaches the blind that many of the pleasures which seemed lost can be regained, and this knowledge has its moral value in bringing out the spirit of independence and in awakening and stimulating the desire to compete once more in the life of the world around.

PHYSICAL EXERCISES.

St. Dunstan's spared no pains to provide the men with all kinds of relaxation and amusement, and it was marvellously interesting to see how soon and with what keenness the inmates interested themselves. Perhaps the most popular of all the amusements was dancing. This was regularly taught and eagerly learned, and it was wonderful to watch the ability displayed by many of the men who were encouraged to compete for prizes given for grace and skill. Singing was another favourite amusement for those who possessed the necessary vocal ability, whilst, similarly, instrumental music found many adherents, and this progressed to the forming of a band of blind musicians. But besides indoor distractions, outdoor sports were in great request, and none more so than rowing and sculling, which furnished splendid exercise, whilst rowing races were eagerly anticipated and keenly contested. These are but examples of the kind of sport and amusement that all the healthy blind can do and do well. There are others, and perhaps some of them would seem utterly impossible. Thus I know of an excellent golfer who stuck to his game even after he had become completely blind. He found that after practice he could, aided by directions from a good caddie, continue to drive a straight ball and pitch fairly accurately to the green, and when there he would measure the distance from ball to hole and test the green by walking from one to the other, then proceeding to putt guided by the sound made by the caddie striking the tin with an iron club.

INTELLECTUAL AND ECONOMIC ASPECTS OF TRAINING.

Thus it is evident that a short time spent at a place like St. Dunstan's should, and generally does, succeed in revolutionising the outlook of one recently blinded and speedily prepares him for the more serious part of the training. The actual training must be considered from two points of view: (*a*) that designed to cultivate the intellectual qualities of the blinded man, and (*b*) that intended to provide him with a means of livelihood. The first chiefly comprises the learning to read Braille and writing by means of the typewriter. Possibly the optophone will eventually supplement Braille, but at present this instrument does not seriously compete with it. It is too expensive for the ordinary person and its difficulties are very great, even to one who is gifted with a musical ear. Braille, too, is disappointing in a very large number of cases. As an intellectual exercise it is excellent, but to read it with sufficient facility much practice and continued exercise of that practice is necessary. The learning of the very numerous contractions is essential, and, even when mastered, proficiency is only retained by constant exercise to prevent the memory from slipping. Thus those who are blinded at a comparatively late stage of life—i.e., after 40 years of age, can rarely acquire the art, and further, the young blinded man of the labouring class, whose education has been completed at the age of 14 years, and who has thereafter spent life in manual labour, has rarely either the intellectual ability required or the necessary delicacy of touch in fingers hardened and blunted by physical toil. Thus it comes about that whilst it is always desirable to include Braille learning as an essential factor in training, the final results of teaching are often disappointing, the pupil very frequently abandoning it when once set free to start life again in the world. One interesting point about Braille is that it seems to appeal very little to those whom one would imagine, at first hand, had most need for it. I mean that those who are busily employed in intellectual work—work requiring much mental concentration—do not seem to use Braille much. It takes too much thought and the man tired from brain work all day cannot, as a rule, be bothered with it at night as a means of relaxation. Typewriting, on the other hand, has not any serious drawbacks of this kind, and the blinded person of average intellect speedily acquires great proficiency. It is an exercise which seems to appeal to every blinded person, and the desire to become expert is stimulated at St. Dunstan's by the present of a typewriter to each man who succeeds in passing what is a very searching test examination of his powers.

Then as to the training the blinded with a view to earning a livelihood. Before the war workshops in which the blind of the labouring classes were taught mat-, brush-, and basket-making, did a great deal of useful work, not only in teaching trades, but in furnishing a market for the wares. There was also a struggling society to train the blind of a higher social standing in the art of massage, which is eminently suitable for the blind; the useful work of this society was much hampered by want of funds. For the comparatively small number of blinded members of the middle and upper classes there was really nothing open, and the teaching of Braille was practically the only effort made on their behalf. The advent of war stranded a number of blinded officers and educated men, and it became as important to provide a sustaining interest in life and often a means of livelihood for these sufferers as for the more numerous patients of lower social rank. A revision of the whole question

of occupations suitable for the blind was necessary, and not one of the very many wonderful gains in knowledge and experience acquired by the war has been greater than the vista of what can be done in the way of training the blind. The question now is not what the blind may be taught but rather what they cannot be taught, for there seem to be but few heights to which a blinded man, under suitable environment, may not rise, provided he is gifted with the necessary grit and determination to make good. Sir Arthur Pearson, himself a man blinded at middle age, endowed with great intellectual capacity and marvellous powers of organisation, has done nothing so great as this, in that he realised in himself that it was still possible for him to carry on after his loss as well and in some ways better than he had done before. His blindness led him to search his powers, and finding out that he was, as he himself expresses it, "not disabled, but only inconvenienced," he opened a home for blinded officers, and living with them himself he imbued them with the same spirit as himself and tried to show them that it was possible for each to make good in some way.

His efforts were crowned with marvellous success in a large number of cases, and I cannot do better than quote a few examples to show what I mean. One blinded officer, who had been manager in a large industrial firm, was taken back on trial by his firm and successfully proved his capacity to carry on his former duties. This gentleman was later sent to Australia to open and organise a fresh branch of the business, and has now returned after a completely successful trip. Two other officers, also totally blinded, started in company with a third sighted partner as insurance agents, and are doing very well. Another officer has resumed work as a barrister, whilst another endowed with an excellent voice was trained as a professional singer. Many others who had no special gifts were taught poultry-farming, whilst others again learned massage, and passed successfully the same examinations for diplomas as sighted candidates. It must be confessed, however, that the training of blinded officers was in some respects more difficult than that of the men. During the war commissions were given to all grades of society and as a result of their disablement a certain number of blinded officers found themselves in possession of an income considerably larger than they had ever had before. In other words, there was a lack of incentive, in some cases due to the feeling that work was not necessary. Others, again, had ample private means before disablement, and this again, but from a different point of view, tended in a few instances to counteract the desire to make good.

SELECTION OF LIVELIHOOD.

Reverting again to the training of the majority, those who belong to the humbler walks in life, the selection of a suitable livelihood for each requires considerable care. For those who have spent their previous life in manual labour the old trades of brush-, mat-, and basket-making cannot be improved upon, for they are easily acquired, and to these may be added boot-repairing or "snobbing," as it is termed, the latter proving a great favourite at St. Dunstan's. Carpentry and even joinery, which at first sight seems almost impossible for a blind man, are also taught at St. Dunstan's, and I have seen some wonderful work done by men who had never learnt anything about joinery until they had been blinded. A wise provision at St. Dunstan's is the teaching of two trades of the simpler kinds. Thus the boot-repairer would also learn how to make mats or baskets or vice versa. The employment of blind instructors is a sound practice, because no one understands the particular difficulties of the blind pupil so well as one who has himself experienced them, and thus a certain number of pupils who can attain sufficient proficiency and possess the other qualifications necessary for teaching may obtain a good living in the future by becoming instructors themselves.

I have already alluded to massage and poultry-farming. The former is obviously only open to those who possess some social qualifications and refinement, and moreover, on account of the delicacy of touch required, is unsuited to those who have spent many years at manual toil. Further, there are stiff examinations to pass, and on this account those who have only the usual board school education behind them are unlikely to prove good pupils. The massage class at St. Dunstan's may be said to comprise the pick of the men from the point of view of refinement and education, and the success that has attended the classes has been extraordinary. For some time past there has been an Association of Certificated Blind Masseurs, and all recent reports show what an unqualified success the exploitation of massage for the blind has been, and no doubt will always continue to be. Poultry farming is another original and most successful experiment. At the outset this was personally superintended and taught by Captain Webber, himself totally blind for many years. Captain Webber discovered this as an amusement, and by practice attained a quite uncanny power of dealing with poultry, at which a sighted man could only marvel. In the poultry class the men are practically taught by lectures and demonstrations everything that appertains to a poultry farm. A farm was run in the grounds of St. Dunstan's and here the men learned to handle and appreciate the different kinds of fowls, to prepare them for table, the secrets of successful breeding and prolific egg production, and in fact everything that a sighted man might know on the subject. The success of the teaching has been abundantly proved by the number of blind men who are to-day successfully putting their teaching to the practical test of running their own farms.

Then, again, for those gifted with a musical ear, pianoforte tuning has for long been recognised as a suitable calling, but the field of employment is rather limited. Telephony has been a successful experiment for some of the better educated, and expert telephonists have been turned out. I have myself always hoped that cigar and cigarette making would come to be numbered amongst suitable employments, but so far I do not think this trade has been tried. I have no doubt as time goes on fresh fields of work will open out, for the interest of the nation has finally been aroused, as is shown by the formation of a Government Department devoted to the welfare of the blind. It is, indeed, as much to the good of the community at large as to the blind themselves that the latter should become good independent citizens.

DIFFICULTIES EXTRANEOUS TO LOSS OF SIGHT.

The training of the blind presents certain difficulties beyond those directly connected with loss of sight. Thus, owing to the more intense concentration of mind required, the hours of work must necessarily be much limited, especially at first. Later on as the work becomes more automatic the blind person can gradually extend the hours of continued labour, but if the work involves much mental exercise it is bound to tire and strain much more than would be the case in a sighted person. At St. Dunstan's, where of course a great many men had experienced severe head and face injuries, the inability to concentrate for more than a very limited period was apparent, and the work-time was limited to two hours in the morning and two hours in the afternoon, and even this proved too long for many of the patients. And as the hours of work must be shorter than normal, so the necessity of filling in spare time becomes of great importance. I have already dwelt at some length on the necessity and usefulness of these relaxations, and need say no further beyond that all St. Dunstan's people are taught string-bag making and netting, employments which need but little mental concentration and afford interest, amusement, and, if need be, some profit. Reading aloud is another great pleasure to many blind people, and good readers will always obtain an appreciative audience. Cards marked with Braille notation enable those fond of this amusement to

quickly learn card games, and I have seen more than one good bridge player among the blinded.

The turning out of an expert blind workman must, therefore, be a comparatively long affair. The average stay of a man at St. Dunstan's is about a year; but very many of the wounded took a much longer time than that, and many had to spend long periods of rest at one of the convalescent homes attached to the Hostel.

SPECIAL DIFFICULTIES OF THE BLIND CRAFTSMAN.

When training has been completed the blinded man has to be launched out into the world to earn his living. Very little difficulty has been experienced with regard to those who have been re-educated in special work, such as massage, telephony, &c. These men are able to compete in the world's market on fairly equal terms with the sighted man, especially when there is a substantial pension in the background to help matters along. But in the case of those trained in handicrafts, as most of the St. Dunstan's men have been, the situation is different and bristling with difficulties. The blind handicraftsman cannot possibly compete on equal terms with the sighted. He cannot work so quickly, or continue to do so for such long hours. His work is apt to deteriorate in quality unless periodically supervised. Little mistakes creep into his work and pass unrecognised, so that the occasional fault is apt to become habitual unless there is someone to overlook the work and put matters right again. The purchase of raw material in the best and cheapest market and the disposal of manufactured goods to the best advantage require help. For these reasons the blinded handicraftsman on leaving St. Dunstan's is handed over to the great After-Care Department, which has done and is doing as much for the blinded of the war as the Hostel itself. This department is ably managed by a brilliant young officer, Captain Ian Fraser, who was blinded early in the war and has been specially selected and trained for the work.

AFTER-CARE.

Thinking over the matter, one would naturally say that the most simple way of surmounting the difficulties of the case would be to draft the handicraftsmen into communal workshops dotted over the country at large commercial centres such as London, Liverpool, Manchester, and Birmingham. Without doubt the principle of this arrangement would be ideal, but practically such a course was neither possible nor altogether desirable for blinded soldiers. The expense of starting and maintaining such workshops would have been prodigious. The existing blind workshop accommodation was and still is woefully inadequate for blind civilians, let alone blinded soldiers and sailors, and I believe I am correct in saying that at the present moment room can be found for only about one-third of the blinded civilians. Then, again, supposing the possibility of such workshop accommodation, it is doubtful if the blinded soldier, with his pension of £2 10s. per week, would work in harmony with the blind civilian whose work has specially to be subsidised to give him a living wage. It would not be fair to pay one hand a less wage for a given article than another, and on the one hand the civilian, unless he received special treatment in this respect, would be in a difficult position, and would resent the soldier with his pension being subsidised on equal terms; whilst on the other hand, the soldier in spite of his pension would probably refuse to work when he was paid at a lower scale than others engaged on the same job. Thus, the formation of large workshops for blinded soldiers and sailors being impracticable, it was decided to deal with the matter by settling the men in various localities where they produced their work at home. This arrangement necessitated (*a*) the formation of a large central depot, which is situated in London, and (*b*) the division of the United Kingdom into districts, each under the care of a specially trained and paid inspector. At the central depôt all the business of the After-Care Department is handled. Raw material is bought and stocked, and manufactured goods are stored for disposal. It is also the headquarters for the financial side, and the general reference centre for all correspondence, and all work connected with the welfare of the men. The local inspectors have much to do. Each man, when trained, is settled in his native district or as near as possible to any locality that he may choose, and it is the business of the inspector of his district to see to his being comfortably and suitably housed. Once there, he is visited at least once in every six weeks by his inspector, who supervises his work and points out mistakes if necessary. The inspector is also responsible for the supply of material and for the sending of his goods to be disposed of by the central depot.

The work is not directly subsidised, and quite rightly so, for with his pension the trained man can earn a very good living; but indirectly a very great deal is done to help each man. The material is supplied at actual cost price, and all expense connected with handling and storing material is charged to the department and is a direct financial loss to it. Thus, the more a man works the more he costs the after-care department, and so, indirectly, the man who works most gets most. Then, as regards sale of work, the man is paid by return of post at the highest market rate obtainable at the moment, and no charge is made for the carriage of his goods to London and for the storing of them. Very often the actual disposal of the goods is much delayed by overstocking, and in the meantime the price may depreciate, so that the department again stands to lose, sometimes very considerably.

In times of sickness, accidents, or business difficulties the department is ready to help. Special care is taken that the patient is well looked after, and, if necessary, money grants are made to help in tiding over times of trouble. When convalescent the patient is sent free of all expense to himself to one of four convalescent homes attached to St. Dunstan's. These are situated at Hastings, Brighton, Cheltenham, and North Berwick, and the home is prepared to keep him as long as necessary. These homes are also used to provide annual holidays, and every man is entitled to a fortnight's rest yearly at one or other of them.

Thus it is obvious that the work of the after-care department is very great and very expensive. It is reckoned that each man, when trained, costs the department about £17 per annum. Of this sum about £12 is expended indirectly in subsidising his work, whilst the remaining £5 represents the average cost from possible sickness, accidents, business difficulties, and holidays. At the present moment there are about 1200 handicraftsmen thus settled, costing the department roughly about £20,000 per annum. Unfortunately there remain about another 300 men to settle, so that the department has to face a considerable increase in expenditure for some time to come. It must not be thought that the department only looks after the handicraftsmen. It is ready to provide help for all those in special lines of work when required, and especially is its help needed with regard to sickness and holidays, but, as already pointed out, those in special work often earn very good wages indeed, and for the most part need no help except in cases of emergency.

THE UNTRAINABLE BLIND.

Mention must be made, too, of the great class of untrainable blind, those who on account of age, infirmities, mutilation, or some consecutive disease, such as tabes, cannot be trained to earn an independent livelihood. Men of this class need a modified course of re-education. For some a light occupation, such as brush-making or chopping sticks for firewood, may still be possible, whilst string-bag and netting, for them as for others, may help to pass away many weary hours. The Moon system of reading, which is very much simpler than Braille, may be taught to those who are too old to learn the latter, but the amount of available literature is limited, and reading Moon is a slow business and apt to become very tedious.

Quite a number of elderly men past 50 years of age who volunteered for labour work during the war were blinded as the result of their unselfish patriotism, and for a certain number of these, together with some who were mutilated in other ways besides being blinded, a permanent and beautiful home has been found at Ilkley in Yorkshire. Here they are maintained in comfort and everything possible is done to mitigate their lot.

THE PROBLEM OF MARRIAGE.

There is one more point of real importance and much difficulty, and that is the marriage of the blind. Every young blinded adult of the male sex very badly needs a partner who can look after him and supervise the numberless details of life, such as dress, appearance, food, and cooking, &c., who, in fact, can make a home for him. And yet to marry a blind man is a very serious step for any girl to take. She probably has it in her power to make him happy or utterly miserable, and to attain the former she must be content absolutely to give up her life to him. There is no middle way, and, therefore, though marriage is highly desirable, the girl must be of the right sort, and the problem is to find her. Many marriages with blind men have taken place during the war, and though some no doubt are proving idyllic, yet I know of others much the reverse, and then the state of the blind partner, or perhaps of the sighted partner, is indeed desperate. I remember one instance where the girl, who had been engaged to the man before he lost his sight and who had married him from pity, told me that she had come to loathe her husband. She was desperately anxious to conceal the fact from him, and naturally was desperately unhappy; they had only been married 18 months and were both fairly young. For blinded girls the situation is rather different. As a rule there is not the same necessity for them to earn their living independently, and they can generally find a home and shelter.

For the young of both sexes who are unmarried, communal settlements run on the lines of clubs are the ideal thing, if there are no parents or relatives to provide a home. To dwell in dreadful isolation in lodgings is indeed a doom to inspire despair, and I hope that in the near future some attempt will be made to start Blind Clubs to shelter these unfortunates.

THE THIRD CLASS OF UNFORTUNATES.

And, lastly, just a word with regard to the third class of cases of which I made mention—viz., those who still possess some useful sight, but insufficient to enable them to earn their own living. A certain number of these cases are in some ways more unfortunate than those who are completely blinded. Many are the cases to whom I have had to refuse admission to St. Dunstan's simply because training would simply mean total loss of what they still had left. A person who can see cannot be taught to work without using his eyes. It is of no use to tell such a person not to look at the work or to bandage the eyes so that he cannot see. If the eyes are not bandaged they will inevitably be called into play upon every little difficulty—i.e., at just the very time when sight is most needed and when it will be especially strained. Bandaging the eyes makes matters rather worse, for the necessary mental concentration will of necessity produce the reflex physical concentration of the eye behind the bandage, and the ultimate result in a very short time is a headache and aching eyes. Then there are others of the same class who can learn a trade without any special harm to the sight, but whose sight gets quickly exhausted, so that it is impossible for the person to work sufficiently long hours to earn a living wage. One really does not know what is the solution for these cases. St. Dunstan's has in many of them come forward with pensions which provide a sufficiency with external help from other sources, such as friends, or the money that a wife may earn; and, so far as I can see, State pensions are in the future the only way by which many persons of this class can be kept from pauperism.

THE SIGNIFICANCE OF SOME EARLY SYMPTOMS OF NERVOUS DISEASE.*

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THERE is no study more fascinating than that of the early symptoms of disease, no problem more difficult to solve than that of their significance. At first it seemed an easy matter to collect out of my experience a series of cases which would enable me to draw some instructive conclusions, but in thinking over my observations I found that the undertaking was going to be difficult, entailing a reconsideration of the meaning of the terms "functional" and "organic," and of the respective significance of subjective and objective symptoms, and that the experience, largely derived since the year 1914, of a psychical factor and of the alleged rapid cures of many nervous disorders by psycho-therapy must be taken into account.

I will limit my remarks mainly to a consideration of pain, numbness, motor disability, and the plantar reflex.

Pain.

The significance of pain varies greatly, partly according to the situation of the lesion, but chiefly in consequence of the varying susceptibilities of the nervous system in different individuals. The course of an intrathoracic aneurysm or of a pyloric cancer may be unattended by pain, and one has seen cases of cerebral tumour in which headache was but slight and certainly far from constant.

Pain in the head, a prominent feature in many of the war neuroses, has been, in some cases, severe and constant, and in these respects indistinguishable from the typical pain of an intracranial tumour. In both instances there may or may not be tenderness on pressure over the painful area; the diagnosis must therefore be based on other aspects of the case. But it is necessary to remember that the presence of a growth may be expressed for a long time by subjective symptoms only, all objective signs of a nervous lesion being absent. Many years ago I had the opportunity of following from beginning to end a case of endothelioma,[1] growing from the dura mater of the right middle fossa of the skull. During the first 16 months, although repeated examinations of the patient were made, the symptoms were entirely subjective, the chief symptom being severe and almost constant headache, made worse by movement and noise. The patient suffered also from nervousness and giddiness; he slept badly and was troubled with horrible dreams. These symptoms are similar to or identical with those of some of the war neuroses, and it is possible that a psycho-analyst might have felt justified in undertaking the treatment. In the seventeenth month and onwards for the next three months till the patient's death, there were definite signs of an intracranial lesion—namely, of implication of the third, fourth, fifth, sixth, and eighth nerves on the right side, and of the seventh and twelfth on the left side. Vomiting and optic neuritis were absent from first to last. Many similar instances of long duration of subjective symptoms in serious disease without objective signs might be mentioned.

During an interview with a patient who complains of headache or other subjective symptoms, we receive, as a rule, impressions from his facial expression, the manner of speech, general behaviour, attitude and movements which unconsciously influence us to decide in favour of or against the presence of serious disease. It is important to subject such impressions to close scrutiny in the hope that we may discover adequate reasons for them; at the same

* This communication was given at a meeting of the Association of Physicians in Birmingham.

time we must not let them have undue weight in our subsequent investigations of the case. We must also admit that they may be fallacious. I could give details of the clinical history of a brain tumour in a boy who, between the ages of 6 and 20, was repeatedly examined by several neurologists. The question of tumour was often discussed, but the verdict was always in favour of a neurosis. At the age of 21 optic neuritis developed and slowly other symptoms appeared, and the diagnosis of an intracranial growth became certain. He lived five or six years longer; an autopsy could not be obtained. In this case the question arises, Had the tumour existed for over 20 years, or did its development begin about the time when optic neuritis was first observed, its presence and the symptoms of neurasthenia having little or no relation to one another?

Do we give adequate consideration to the analysis of subjective symptoms? Do we try to deduce as much as possible from a study of each individual symptom? The study of such a symptom as constant headache is perhaps not likely to reveal features peculiar to any particular disease, but the possibility may be admitted when we recall the characteristics of other pains; for example, the momentary pains of tabes dorsalis, which, as F. Buzzard [2] has recently pointed out, differ from other lightning pains in the fact that they seem to stab the limb at right angles to its surface.

Numbness.

This subjective sensation is a common initial symptom of affections of the nerves, spinal cord, and brain, and may exist for some time before any objective signs of disease can be detected. Its presence should put us on the alert for future developments; for example, temporary numbness of the face or hand may precede by several weeks an attack of hemiplegia, or the onset of the characteristic symptoms of disseminate sclerosis.

In testing for anæsthesia the use of the tuning fork must be remembered, for, as R. T. Williamson has repeatedly stated, loss of the vibratory sensation, all other forms of sensation being normal, is one of the earliest signs of an affection of the sensory tract.

In the Bradshaw lecture,[3] given in the year 1901, I described an interesting case of numbness affecting the outer side of the left arm, which had persisted for four years without the development of other symptoms; I remarked that the distribution of the numbness suggested a slight lesion of the fifth cervical root, possibly the constant action of some poison which had a preference for that region, and that the future development of signs of serious disease could not be excluded. Last year the patient consulted me again—that is, 23 years after the onset of the paræsthesia. The upper limbs, with the exception of the hands, were completely paralysed, and most of the muscles atrophied. The knee-jerks were exaggerated, there was ankle-clonus, with an extensor plantar reflex on both sides. The condition closely resembled amyotrophic lateral sclerosis, but there was slight anæsthesia down the outer sides of both arms, and this, together with the long duration of the case, made me think that the lesion was some rare variety of pachymeningitis with invasion and compression of the spinal cord.

Motor Disability.

Just as there may be paræsthesia without anæsthesia, so there may be motor disability without any paralysis, spasm, or incoördination of muscles. In disseminate sclerosis one of the earliest symptoms noticed by the patient is a feeling of weakness and heaviness in the legs. On examination no motor weakness can be detected or possibly only slight weakness of the flexors of one hip. In the occupation neuroses there is a defect in the coördination of muscles needed for the performance of some skilled acquired movement. In my experience, taking "writer's cramp" as an example, a careful examination has rarely revealed anything beyond the fact that the patient had imperfect control over the muscles used in writing, every other movement, as well as sensation, being perfectly normal. It must always be borne in mind that such disability in the performance of delicate actions may be the first sign of a cerebral growth, of paralysis agitans, or other grave disorder of the nervous system.

Before passing to a consideration of some positive signs of disease let me say a word about the terms "functional" and "organic." These terms are misleading and their abolition is desirable. A symptom, whether subjective or objective, is evidence of a disturbance of function, and nothing more. Anæsthesia or paralysis merely indicates a disturbance of the normal activity of the sensory path in the former case and of the motor path in the latter; an extensor plantar reflex, interference with the normal activity of the pyramidal system. Compression of the ulnar nerve at the elbow is followed by numbness and tingling and some anæsthesia of the two inner fingers; the impaired sensation persists as long as the compression is continued. There must be some tissue change caused by the squeezing. Is the condition to be called functional or organic? In my opinion every so-called functional disorder has an anatomical basis—a molecular or other change, however transitory that may be.

The Plantar Reflex.

The remissions and variations of the symptoms which occur in the early stage of disseminate sclerosis, followed by their partial or complete disappearance for months or even years, are well known and difficult to account for. Arthur Hurst[4] believes that many of the early symptoms are hysterical and that the periods of improvement are the result of some suggestion to the mind of the patient. He says that it is hardly conceivable that sufficient change should occur in the central nervous system to account for the conversion of complete paraplegia into slight stiffness and weakness of the legs, or of total blindness into slightly indistinct vision; that such results are best explained by the influence of some form of psycho-therapy.

But this explanation is scarcely applicable to the rapid and repeated interchange of the reflexes which sometimes occurs in this disease. A remarkable instance of this is recorded by Dixon Mann.[5] Six months after the onset of disease the legs were slightly spastic, the knee-jerks were exaggerated, there was well-marked ankle-clonus, and the plantar reflex on both sides was extensor. Ten days later ankle-clonus could not be obtained and the plantar reflex was flexor on both sides. A fortnight later the plantar reflex was extensor on the left side and flexor on the right. A week later it was again extensor on both sides. The patient improved progressively during the ensuing ten days and left the hospital able to walk with ease. She was readmitted when similar changes in the reflexes were observed.

In commenting on this case Dixon Mann says that responses so immediately contradictory were probably due to the direct action of a toxin on the neurones. He refers to the effect of certain narcotic drugs on the plantar reflex; for example, after an injection of scopolamine the extensor response can be obtained in from 15 to 60 minutes, and may persist for several hours.

Now if it be assumed that a toxin is the causal agent of disseminate sclerosis, and that in the early stages of the disease the toxin is produced intermittently, then we have an explanation for the rapid oscillation of many of the cardinal symptoms, the disturbance of function occurring in waves, corresponding to the intermittent evolution of the toxin and subsiding as each batch of toxin is exhausted.

Such an hypothesis will also explain the temporary duration of an ocular paralysis, which sometimes precedes the typical symptoms of disseminate sclerosis. These ups and downs are not peculiar to this malady. The clinical histories of tabes, general paralysis, and of other chronic nervous diseases are prolific in instances of arrested progress, and of alternating

periods of improvement and breakdown. Surely such ebbs and flows cannot be put down to variations in psychical influences—important as such influences are in modifying the course of every disease—unless we admit that they may increase the output of antitoxins, or in some other way check the action of the toxic agent. I should be the last to deny the influence of minute lesions of nerve tissue in exciting an outbreak of hysterical symptoms in persons who have an abnormal suggestibility. There is also reason to believe, as I have stated in a previous communication,[6] that emotional disturbance is an important ætiological factor in maladies other than the neuroses; for example, cases of chorea, paralysis agitans, and pernicious anæmia have developed immediately or soon after a fright or other emotional shock. Indeed, we may admit the possibility that hysteria itself can initiate changes which progress into detectable lesions. Charcot assumed that lateral sclerosis might occur as a direct outcome of changes started by hysterical contractures of long duration. Moreover, if cutaneous blisters can be produced by "suggestion," as recently stated by Dr. J. A. Hadfield,[7] why not exudations into the spinal cord? Are we quite certain that a true extensor plantar response is never the result of the effects of hysteria? At the present time I have an hysterical patient whose knee-jerks cannot be elicited. The Wassermann reaction is negative, and there are no signs of disease, either of the nerves or of the central nervous system.

At the end of his charming little book, "On the Simulation of Hysteria by Organic Disease of the Nervous System,"[8] Thomas Buzzard says, "the figure of hysteria shrinks in proportion as the various forms of organic disease acquire greater solidity and sharper definition."

In contrast to this view the present-day psychotherapeutist might say: "The figure of hysteria enlarges in proportion as the various symptoms attributed to organic disease are found to disappear under the influence of psychotherapy."

Conclusion.

But whichever view is held, the danger of suggesting symptoms to the patient must not be allowed to hamper the close clinical investigation of all his complaints; full consideration must be accorded to transitory manifestations of disease, and if a decision is given in favour of hysteria, the possibility of future developments must not be overlooked; subsequent examinations of the patient must be as thorough as the first examination, and quite unbiased by the first diagnosis of hysteria.

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DONATIONS AND BEQUESTS.—Mr. Walter Beer, cotton merchant, Liverpool, left estate of over £190,000. The testator left £200 each to the Old Hebrew Congregation, Princes-road, Liverpool; the David Lewis Northern Hospital; the Royal Southern Hospital, Liverpool; and the Liverpool Royal Infirmary; £100 each to the Liverpool Dental Hospital; the Liverpool Hospital for Cancer and Diseases of the Skin; the Liverpool Eye and Ear Infirmary, Myrtle-street; the Liverpool Infirmary for Children; the Stanley Hospital, Liverpool; St. Paul's Eye Hospital, Oldhall-street, Liverpool; the Leasowe Sanatorium for Crippled Children; and the Liverpool Hebrew Ladies' Benevolent Institution.—Under the will of the late Dr. Charles A. Hingston, of Plymouth, the Y.M.C.A., of which he was a leader in the western counties, will benefit by the acquisition of property in Plymouth as well as by legacies of money. The testator, among other bequests, also left £2000 to the Convalescent Home, Crown Hill, Plymouth; £500 to the Plymouth and District Deaf and Dumb Institution; and £200 to the Plymouth Public Dispensary.—The Board of Management of the Royal Infirmary, Manchester, have received £2853 from the local Hospital Sunday Fund, a legacy of £200 from the late Mr. Joseph Core, of Manchester, and other sums from various sources to the amount of £626.

STUDIES FROM THE ST. ANDREWS INSTITUTE OF CLINICAL RESEARCH.

Preface by Sir JAMES MACKENZIE, F.R.S.,
DIRECTOR OF THE INSTITUTE.

THE prime object of research in this Institute being the prevention of the diseases common among the people, the question arose as to what might be these diseases. A preliminary inquiry had revealed the insuperable difficulty of obtaining this knowledge; a more elaborate inquiry was determined upon, but it was soon found impossible to arrive at a knowledge of the diseases themselves. The inquiry therefore took the form of an investigation into the state of medical knowledge concerning them. The three studies which follow are the outcome of the inquiry undertaken by the members of the clinical staff of the Institute, with Dr. Andrew Rowand as chairman, a complete report of which is to be published shortly.

I. PRESENT STATE OF MEDICAL KNOWLEDGE REGARDING THE DISEASES COMMON AMONG THE PEOPLE.

BY ANDREW ROWAND, M.B. EDIN.

The following paper is the outcome of the inquiry in what proportion of the cases met with in general practice it is possible to arrive at a diagnosis. A series of cases was taken from the records of general practice in St. Andrews; the series was consecutive, and no selection was made from the cases. The time and care given to them had been limited by the demands made on two general practitioners doing their routine work; the notes were made at the time the patients were seen, and were not afterwards elaborated. In the majority of cases the patients were seen in the consulting room, and so were not suffering from acute or advanced disease requiring confinement to bed. There was no epidemic at the time.

The cases examined numbered 896; as 102 of them had been referred to the Institute for more thorough examination, or for examination in the special departments, and so appear in the records of the Institute, they were deducted from the practitioners' lists and included in a series of 314 Institute cases which were examined in the same way. As the great majority of the private cases were able to move about there was a similarity between the two series, there being no beds in the Institute, but as many advanced cases were brought to the Institute because of some special interest in their symptoms, or for the benefit of examination in the special departments, fewer of such cases appear in the lists of the practitioners than would otherwise have been the case. There is no essential difference between private and Institute cases; the main object of the Institute is to assist the practitioner in the investigation of the early diseases and vague ailments which he meets from day to day. The terms "private" and "Institute" are adopted for convenience; all the cases are private patients.

Preliminary Selection of Cases.

The first step taken was to put aside from the private records a number of cases which might be regarded as so obvious that the diagnosis was self-evident, or so trivial as to be of no interest in the investigation. The selection proved to be a matter of extreme difficulty, and it is questionable if it was wise to attempt it. Each case was considered on its merits, so that in one case a condition has been excluded as obvious, while in another it has been retained. Hernia, for example, appears in the lists both of the selected and the rejected. A hernia is obvious when the patient is aware of its presence and comes to the doctor to have a truss adjusted; but it is a different matter when its existence is revealed on examination and is found to explain symptom

capable of misinterpretation. It would be of no value to go over in detail the list of cases excluded; even if the reasons were given in every instance difference of opinion would still exist. But even if the results reached in this investigation may be attacked by the strict statistician they point to general conclusions of interest and value, and it will be shown that these conclusions do not materially depend on the selection and rejection of the cases.

Of the private cases, 134 were rejected as obvious or trivial, leaving a total of 660. None of the Institute cases were put aside, as all were of interest. Adding the 314 Institute cases to the 660 private cases we have 974 cases in all. It seemed to the Committee that this material was sufficient for our immediate purpose. It would be an easy matter to deal with all cases in future if we could devise some useful method of classification. The difficulty was to find some principle on which to proceed.

Two Classes of Case Presenting Special Difficulty.

At the outset two classes of cases which we had retained on our list presented a difficult problem.

1. *Cases of Pregnancy.*—In several instances the patient came for advice not because of pregnancy, but because of certain symptoms of which the explanation was not obvious. For the determination of pregnancy and the exclusion of disease careful examination was necessary. This surely is a type of successful diagnosis, not indeed of disease but of health, or rather of a physiological condition which sets up its own reflexes and is capable of disturbing many others. To what extent this disturbance may occur without some associated condition of ill-health may be beyond the possibility of definite determination; it is therefore a matter of individual opinion whether a pregnancy is strictly normal or not.

2. *Cases of Physiological or Functional Cardiac Murmurs.*—If a patient presents a sign or symptom suggestive of disease but now known to be compatible with perfect health, and if after the most careful examination no associated symptom pointing to disease is detected, the conclusion is reached that he must be regarded and treated as a person in normal health. That this is an invaluable type of diagnosis in view of the patient's future in life cannot be denied; it therefore finds a place in our classification. There is little doubt that in connexion with suspected disease in other organs there may be symptoms, now regarded as of grave significance, which in the future will be found to be of little or no importance; meanwhile we consider only cardiac murmurs, and in all cases where they were judged to be of no significance we have had the assistance of Sir James Mackenzie's special knowledge and wide experience in making the decision.

Consideration of these two classes of cases makes plain the constant possibility of error, and in fact difference of opinion occurs in a large proportion of cases. But for our purpose it is necessary to accept the opinion of the doctor concerned when he claims to have reached a diagnosis. It is inevitable that in an often necessarily brief consulting-room examination, some fact essential to a diagnosis will be overlooked from time to time; more frequently, no doubt, a diagnosis is reached which a more prolonged investigation would not have warranted. But it appears unlikely that in the present state of medicine there would be any great dissimilarity in the proportions of diagnosed and undiagnosed cases in many series of investigations such as we have made. The proportion depends not on the skill or training of individual practitioners, but on the unsatisfactory state of all medical knowledge.

Definition of Diagnosis.

What has been written so far is largely introductory. We now come to the difficult question: What is a diagnosis? There is no general agreement as to the meaning of the term. From its derivation it might be taken to mean either a complete knowledge or a knowledge sufficient for the purpose of separation or differentiation, according as we translate "dia" as "thorough" or "through." If no case can be regarded as diagnosed unless the physician has a thorough knowledge in all its aspects of the disease from which the patient is suffering, it is obvious that the percentage of cases diagnosed must approach the vanishing point. Diagnosis has been defined as "the discrimination of diseases by their distinctive marks," or "the differentiation of diseases by their distinctive symptoms." But such a definition is confusing, for we do not imply that the differentiation of diseases is impossible when we say that cases are undiagnosable. For the purpose of this investigation we define diagnosis as "the recognition in the patient of a known disease from the symptoms which are characteristic of it." If he exhibits a well-defined group of symptoms distinctive, so far as present knowledge goes, of one disease only, his case can be diagnosed. The physician fails in diagnosis if he does not recognise these symptoms when they are present, or if he assumes that they are present with insufficient evidence; it cannot be said that his diagnostic powers are at fault if the case shows no such characteristic symptoms. The differentiation of diseases has not gone far enough to enable him to understand or even to name the condition. The most prominent symptom may be chosen and the disease named after it, or a variety of symptoms may be selected and the patient shown to be suffering from a complication of troubles. The latter plan is tempting because it makes the difficulty of the case apparent both to the patient and to his friends, and explains the necessity for practically any variety of treatment that may be adopted. In these days, when the doctor is almost forced to give a name to the illness either by panel authorities or anxious relatives, such a multiplication of terms may be useful, but it is certainly demoralising.

Ætiology and Diagnosis.

There is another matter in regard to diagnosis which merits consideration. From the point of view of diagnosis, knowledge of the cause of the disease which has been recognised is not essential. With the question of ætiology diagnosis is not immediately concerned. If in addition to the well-defined group of symptoms the noxious agent causing injury to the organism is known, or if its nature can be reasonably inferred by analogy from other diseases showing similar symptoms and a similar course, our knowledge of the disease is much more satisfactory, but this question is not primarily one of diagnosis or recognition. Definite diseases have, in fact, in practically all cases, been separated by their distinctive symptoms, and their diagnosis made possible without error, before the nature of the agent at work has been discovered. Typhoid fever, for example, was diagnosable before the typhoid bacillus was found. It is the work of the clinician to separate diseases by their characteristic symptoms in order to give the chemist, bacteriologist, or other laboratory worker the opportunity of making his special investigations with regard to them.

Diagnosis and Treatment.

The relationship between diagnosis and treatment suggests itself at this point. The objects of diagnosis are prognosis and intelligent treatment, and for the treatment of any disease recognition of symptoms and interpretation of their cause are necessary from day to day. A sufficiently definite group of symptoms may be present to enable a perfect diagnosis to be made, but all the symptoms of a disease are not present at once; they must all be watched for, though some may never appear. A lesion may occur which, though itself a symptom, can produce secondary symptoms of its own and modify the whole outlook. In acute rheumatism symptoms of endocarditis may or may not be present, and are not necessary for the diagnosis; but the occurrence of endocarditis at any stage of the disease is a matter of the gravest importance as affecting both prognosis and treatment. In

a sense it is itself a disease. The diagrams (Figs. 1 and 2) illustrate this point.

We say that we diagnose the endocarditis from its own characteristic symptoms. The use of the word in this secondary sense may appear to introduce confusion, but it is unavoidable. It is, however, necessary to keep clearly in view the distinction between a disease and a symptom, and to hesitate to accept as a diagnosis of disease what, even in the obscure light of our present knowledge, is probably only the name of a symptom. As knowledge advances

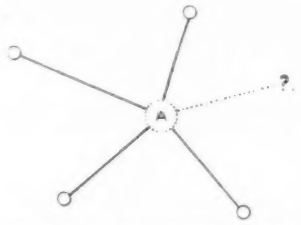

FIG. 1 shows the symptoms which enabled the primary diagnosis to be made, and indicates the necessity of watching for further symptoms.

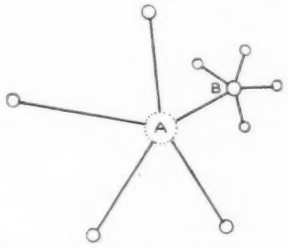

FIG. 2 shows in addition the presence of endocarditis.

In Figs. 1, 2, 3, 4, A represents the noxious agent. The circles at the periphery represent the symptoms or reactions.
B represents endocarditis with its own group of symptoms.

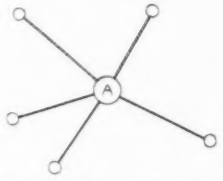

FIG. 3 represents a disease where A, the agent acting injuriously on the tissues, is recognised, and produces reaction or symptoms which are represented by circles at the periphery. Examples given by Sir James Mackenzie are typhoid fever and conjunctivitis due to a foreign body in the eye.

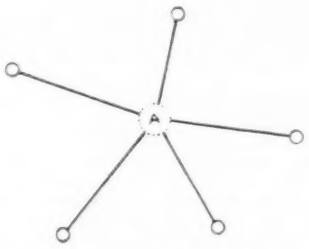

FIG. 4 represents a disease where, while the symptoms are recognised, the injurious agent A has not been recognised, though its nature can be inferred. The examples given are measles and scarlet fever.

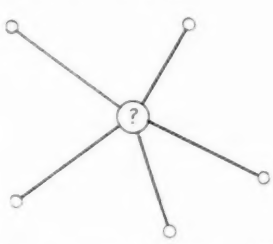

FIG. 5 represents a disease with a well-defined group of symptoms, but where the nature of the agent is not recognised. The examples given are migraine and convulsions. ? represents the noxious agent, the nature of which is unknown. The circles at the periphery represent the symptoms or reactions.

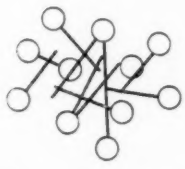

FIG. 6 represents the vast majority of diseases, where a number of uncoordinated symptoms are present with no recognisable cause.

many diseases now regarded as primary will certainly be found to be secondary, and what is a primary diagnosis to-day may be a secondary diagnosis to-morrow. This matter will receive further consideration later.

Classification of Diseases.

Diagnosis is only possible in so far as diseases have been differentiated and classified. The differentiation of diseases is lamentably inadequate; some new basis of classification must be found to save us from the increasing complexity and confusion which are the despair of the medical practitioner. Sir James Mackenzie, in his study of "The Theory of Disturbed Reflexes in the Production of Disease," has separated diseases into four classes, as shown in Figs. 3, 4, 5, 6.

We regard all cases that can be grouped under the first three classes as diagnosed. Whether the noxious agent be known, inferred, or unknown, the disease can be diagnosed if it presents a distinctive group of symptoms. The cases which can be fitted into Class 1 are the most satisfactory in the sense that the diseases from which they suffer are the most thoroughly understood, but we take as the criterion of diagnosis the recognition of a perfectly definite group of symptoms belonging, so far as our present knowledge goes, to one disease and one disease only. Cases falling into Class 4 are undiagnosable.

We have extended this classification, not in order to amplify it as a classification of diseases, but to form a classification of the cases with which the doctor has to deal in his ordinary work. We have added two groups, and the question of diagnosis will be considered with regard to them also. Of the six classes, Nos. 1, 2, 3, and 6 are Sir James Mackenzie's four classes of diseases. There will inevitably be difference of opinion with regard to our allocation of cases to different classes, but there is no finality in any classification, and if this study of the subject of diagnosis does no more than bring this fact into prominence it will have served a useful purpose.

Class 1 (Fig. 3).—The standard example of diseases belonging to this class is conjunctivitis due to a foreign body in the eye. Few cases, apart from those generally regarded as obvious, approach this standard. Renal colic due to renal calculus is a good example, and we include, of course, the microbic infections. But the noxious agent in these cases may or may not be the primary cause of the disease; it is no doubt a necessary agent, but it may not stand alone or even be of chief importance. There must be some other element not at present understood. The presence of the pneumococcus in the respiratory secretions is no evidence that the patient is suffering from pneumonia; when the clinical symptoms of the disease are present it is superfluous to search for the germ. We have little idea of the conditions under which the pneumococcus, apparently ubiquitous and generally innocuous, can become malignant. Other examples of the class are tuberculosis, syphilis, dysentery, malaria, diphtheria, and ringworm.

As has been already mentioned, we have included many cases which, though simple in nature, cannot in our view be regarded as necessarily trivial or obvious—for example, an ulcer of the lip caused by the sharp edge of a tooth. We also include several fractures, injuries the nature of which was verified by the aid of the X rays, and a number of hernias. In Class 1 are placed 34 (10·82 per cent.) of the 314 Institute cases, 77 (11·66 per cent.) of the 660 private cases, and 111 (11·39 per cent.) of the total 974 cases.

The following is a complete list of Class 1; recognised causes are given in italics:—

Institute (34 cases).

Adenitis (*carious molar*).	Neuritis—peripheral (*lead poisoning*).
Ascariasis.	Phthisis pulmonalis, 9 cases.
Dysentery, 2 cases.	Pleurisy—traumatic, 2 cases.
Diphtheria (exhaustion following).	Pulmonary impairment (*injury*).
Gunshot wound (shrapnel in neck: pain).	Prolapse of uterus.
Hernia, 2 cases.	Rupture of spleen.
Headache (*refractive error*).	Renal colic (renal calculus).
Headache (*involvement of nerve-endings in scar*).	Syphilis, 2 cases.
Heart, congenital, 2 cases.	Systolic murmur—physiological, 2 cases.
Laryngitis (*excessive use of tobacco*)	Tuberculosis of bones.

Private (77 cases).

Alcoholism.	Headache (*refractive error*), 2 cases.
Alcoholism, gastritis.	Impetigo contagiosa, 7 cases.
Abscess of auditory meatus, 2 cases.	Malaria.
Adenitis (*carious teeth*).	Obstruction of parotid duct.
Amblyopia (*tobacco*).	Pneumonia—Empyema.
Abscess of toe (following *injury*).	Pneumonia, 2 cases.
Cartilage loose, semilunar.	Periostitis of tibia (*traumatic*).
Conjunctivitis (*burn*).	Pregnancy, 6 cases.
Contusion of chest.	Prolapse of uterus, 3 cases.
Contusion of sternum.	Phthisis pulmonalis, 5 cases.
Contusion of metacarpo-phalangeal joint, verified by X rays.	Ringworm.
	Sapræmia (following *curettage*).
Concussion of brain.	Septic cellulitis (following *scratch*).
Diphtheria, 2 cases.	Synovitis of shoulder (*traumatic*).
Epididymitis, gonorrhœal.	Synovitis of knee (*traumatic*).
Epididymitis (*tuberculous*).	Syphilis, 5 cases.
Fracture of tibia, partial (X rays).	Strain of muscle.
Fracture, greenstick.	Systolic murmur—functional.
Fracture of clavicle, 2 cases.	Talipes valgus.
Fracture, old (X rays).	Thrombosis (following *typhoid*).
Fracture of patella, 2 cases.	Tuberculosis of glands of neck.
Gingivitis (*carious teeth*).	Tuberculosis of joints.
Gonorrhœa, 2 cases.	Ulcer of lip (*tooth*).
Hernia, 4 cases.	

Class 2 (Fig. 4).—This is a small class. Included in it are trench fever, influenza, acute rheumatism, measles, and German measles. It would be considerably smaller but for the fact that we have included rheumatoid arthritis, a very doubtful decision. There are no cases of scarlet fever; many cases which formerly would have been diagnosed without hesitation as scarlet fever have probably been relegated to some other category. It might indeed be argued with some weight that scarlet fever is not a distinct entity at all. These matters are only mentioned to illustrate the fact that finality in classification is impossible. In this class are placed 7 (2·23 per cent.) of the 314 Institute cases, 13 (1·97 per cent.) of the 660 private cases, and 20 (2·05 per cent.) of the total 974 cases. The following is a complete list of Class 2:—

Institute (7 cases).

Encephalitis lethargica.	Rheumatoid arthritis, 4 cases.
Poliomyelitis anterior acuta.	Trench fever.

Private (13 cases).

German measles.	Rheumatoid arthritis, 3 cases.
Influenza.	Trench fever (pains in shins following).
Measles.	
Rheumatism, acute, 6 cases.	

Class 3 (Fig. 5).—This is a larger group, approximating in size to Class 1; the numbers are swelled by the inclusion of rheumatic cases—not all those cases which might be casually labelled as rheumatic, but those with a sufficiently definite picture, Prof. R. Stockman's definition being taken as the standard. To select such cases is very difficult; probably we included too many, as the term rheumatism is sometimes applied without sufficient investigation. Examples of other diseases in this class are Hodgkin's disease, exophthalmic goitre, asthma, epilepsy, gall-stones disease, and myeloid leukæmia. It is of some interest to note that herpes zoster, which we include in this class, is now thought by some to have a close relationship to chicken-pox, which would be placed in Class 2. Many of these cases showing interesting symptom-complexes were brought to the Institute for fuller examination, which accounts for the larger proportion on the Institute list. In Class 3 were placed 34 (10·82 per cent.) of the 314 Institute cases, 51 (7·72 per cent.) of the 660 private cases, and 111 (8·72 per cent.) of the total 974 cases. The following is a complete list of Class 3:—

Institute (34 cases).

Acidosis.
Asthma, 3 cases.
Epilepsy, 2 cases.
Exophthalmic goitre, 2 cases.
Gall-stones disease, 3 cases.
Habit spasm.
Herpes zoster, 4 cases.
Hodgkin's disease.
Hysteria.
Insanity (inhibitional).
Migraine, 2 cases.
Myeloid leukæmia.
Myxœdema.
Recurrent mania.
Recurrent vomiting of childhood, 2 cases.
Renal colic, 2 cases.
Rheumatism, 6 cases.

Private (51 cases).

Asthma, 6 cases.
Asthma and emphysema.
Convulsions of infancy.
Eczema, 3 cases.
Epilepsy, 4 cases.
Erythema multiforme.
Exophthalmic goitre, 2 cases.
Gall-stones disease.
Herpes zoster, 6 cases.
Migraine, 4 cases.
Myxœdema.
Pemphigus.
Rheumatism, 13 cases.
Urticaria—asthma.
Urticaria, 6 cases.

Class 4 (Fig. 7).—In this class we place end-results, by which we do not mean the concluding stages of known progressive disease, for example, phthisis, but conditions of permanent damage to organs or tissues, the original noxious agent, whether known or unknown, having ceased to be of importance and the damaged organ itself being now a noxious agent giving rise to symptoms of disease. Examples of this class are angina pectoris, auricular fibrillation, adherent pericardium, heart-block, and cases of malignant disease. At present we are unable to diagnose malignant disease in its initial stages, but it is necessary to detect the damage it has caused at the earliest possible moment in order to give the surgeon his opportunity. In this class were placed 45 (14·33 per cent.) of the 314 Institute cases, 14 (2·12 per cent.) of the 660 private cases, and 59 (6·05 per cent.) of the total 974 cases. The much higher percentage in the Institute cases is explained by the fact that few advanced cases requiring confinement to bed were recorded, and that the great majority of those able to move about were taken to the Institute for examination. The following is the complete list of Class 4:—

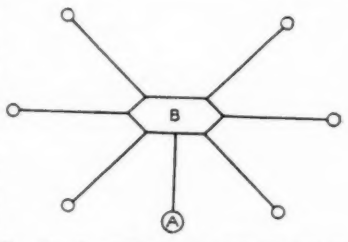

FIG. 7.—A represents the original noxious agent. B represents the permanently damaged organ or tissue. The circles at the periphery represent the symptoms or reactions.

Institute (45 cases).

Adherent pericardium.	Intermittent claudication with auricular fibrillation.
Angina pectoris, 8 cases.	Malignant disease, 5 cases.
Arterio-sclerosis, 2 cases.	Senility—alcoholism.
Auricular fibrillation, 5 cases.	Senility—rectal prolapse.
Auricular flutter.	Spastic paraplegia, 2 cases.
Cardio-sclerosis, 4 cases.	Valvular disease of heart, 10 cases.
Heart-block, 4 cases.	

Private (14 cases).

Angina pectoris, 2 cases.	Epilepsy (following injury to head).
Aortic regurgitation.	Heart-block.
Arterio-sclerosis—occlusion of posterior tibial artery.	Malignant disease, 2 cases.
Auricular fibrillation, 4 cases.	Senile dementia.
	Senile hemiplegia.

Class 5 (Fig. 8).—In this class are included cases in which a definite local lesion or morbid condition exists, giving rise to symptoms—the noxious agent causing the mischief being unknown, and no uncoordinated symptoms being present, so far as can be determined at the time of examination, indicative of more widespread disease. The lesion may be visible, or inferred with practical certainty, from the symptoms observed. Such cases form a large proportion of those met with in general practice, and among them the doctor meets with his greatest successes as well as his most grievous disappointments. His treatment is symptomatic, and he awaits the outcome to show whether or not his diagnosis, easily made because all these conditions have been labelled

as diseases, has been correct. The diagnosis is, therefore, purely provisional. In many instances of this class the noxious agent, whatever it may be, appears to have a purely local action, and nature is able to get rid of it without damage, aided perhaps by approximate remedies. But we know that these local conditions appear so commonly as symptoms of more generalised disease that we hesitate to treat them lightly, or to judge of their significance without prolonged observation.

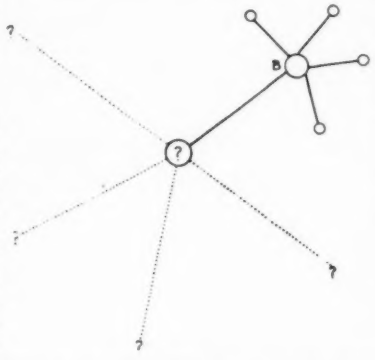

FIG. 8.—? represents the noxious agent; B represents the local lesion giving rise to a group of symptoms. The dotted lines indicate that a watch must be kept for more generalised symptoms.

Bronchitis may be taken as a typical instance. We do not include in this class recurrent bronchial catarrhs of children, which suggest some underlying weakness, or the chronic cough of middle and later life which is associated with degenerative changes, but cases are included in which no other signs of disease could be detected at the time of examination. We know that attacks may pass off, leave no trace and never recur. But everyone has found other symptoms appear at some later date, and has watched the gradual emergence of the typical picture of pulmonary tuberculosis (Fig. 9). We have made the

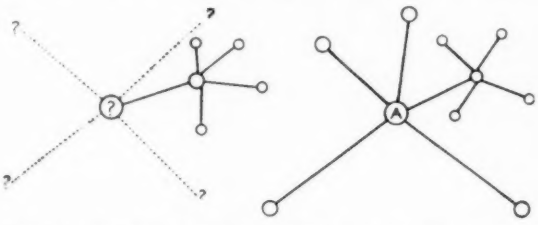

FIG. 9.—Showing gradual emergence of the primary diagnosis.

secondary diagnosis before the primary diagnosis, and in this case the secondary condition was of comparatively trifling importance. The diagnosis of acute rheumatism, followed by detection of endocarditis, was of a different order.

It should be noted that when a case assigned to this class alters its picture—except by addition to the group of symptoms explicable by the existence of the local lesion, that is to say, when it becomes necessary to fill in any of the dotted lines and queries—it ceases to belong to that class and finds its place in one of the others. We have included appendicitis and gastric ulcer, because with our present knowledge it is impossible to determine how far they are symptoms and how far diseases in themselves.

In Class 5 are placed 62 (19·74 per cent.) of the 314 Institute cases, 155 (23·48 per cent.) of the 660 private cases, and 217 (22·27 per cent.) of the total 974 cases. The following are examples from the lists:

Institute (62 cases).		*Private* (155 cases).	
Appendicitis.	Intestinal catarrh—thread-worms.	Acne rosacea.	Nephritis.
Blepharitis.	Laryngitis.	Acne vulgaris.	Otitis media.
Bronchitis.	Nephritis.	Adenoids.	Pharyngitis.
Colitis.	Occipital neuralgia.	Bronchitis.	Phlebitis
Constipation.	Pleurisy.	Coccygodynia.	Pleurisy.
Cystitis.	Pyelitis.	Chronic rhinitis.	Sciatica.
Duodenal ulcer.	Sciatica.	Conjunctivitis.	Synovitis.
Gastric ulcer.		Constipation.	Tonsillitis.
Hæmorrhoids.		Gastric ulcer.	Ulcer of auditory meatus.
Intestinal adhesions.		Glossitis.	
		Mastitis.	

Class 6 (Fig. 6) contains the cases showing a number of uncoördinated symptoms with no recognisable common cause. Most of our time at the Institute is spent in endeavouring to study such cases. In going over the Institute records from the beginning we indexed all the cases under "leading symptom" and "provisional diagnosis," and endeavoured to divide this undiagnosable class into groups, for example, intestinal toxæmia, neurasthenia, dyspepsia, &c. It might be better not to employ such terms at all, as they are apt to give an unconscious bias in favour of one theory over another.

Symptoms of toxæmia are very similar in all cases, and to search for a correspondence in symptoms among the members of a group formed on no more sure basis than the existence of constipation, or the presence, or suspected presence, of ileal stasis may be a waste of time. It would be more satisfactory to form no subdivisions until some definite grouping of symptoms has emerged from a general study of all the cases. In Class 6 are placed 132 (42·03 per cent.) of the 314 Institute cases, 350 (53·03 per cent.) of the 660 private cases, and 482 (49·48 per cent.) of the total 974 cases. The following are examples from the lists:—

Institute (132 cases).	*Private* (350 cases).
Anæmia with history of tachycardia.	Bilious attacks.
Chronic dyspepsia.	Cough, exhaustion, insomnia.
Dyspepsia—palpitation.	Dyspepsia—mental depression.
Exhaustion.	Dyspepsia—palpitation.
Intestinal stasis.	Exhaustion—abdominal pain.
Intestinal toxæmia.	Exhaustion—extensive temporary staining of skin.
Gastro-intestinal derangement.	Exhaustion following pyrexia of unknown origin.
Malnutrition.	Exhaustion—giddiness.
Nervous disorder (functional).	Exhaustion—headache—dyspnœa.
Neurasthenia—dyspepsia.	Exhaustion—palpitation—constipation.
Toxæmia of unknown origin.	Fainting attacks.
Toxæmia—tachycardia.	Headache—cough—exhaustion.
Toxæmia—toxic angina.	Headache—worry—dyspepsia.
Vasomotor instability.	Nausea—epigastric tenderness.
	Menstrual irregularity.
	Neurasthenia.

From this confused class will no doubt emerge in time not only cases of advanced disease, the first symptoms of which are already present but not understood, but also cases proving in their progress the relationships of many diseases now regarded as entirely dissociated, and even the common origin of many of them. The undiagnosable cases are apt to cause despair to the general practitioner, but if they are viewed rightly they present him with an invaluable field of study—the study of early diseases—which is really open to him alone.

Grouping of Cases.

We are grouping all cases seen at the Institute under the six classes with the object of noting what transference from one class to another may take place during observation and treatment.

The following tables give the numbers and proportions of cases in the various classes:—

	Institute cases (314)		Private cases (660).		Total cases (974)	
Class	No.	Per cent.	No.	Per cent.	No.	Per cent.
1	34	10·82	77	11·66	111	11·39
2	7	2·23	13	2·00	20	2·05
3	34	10·82	51	7·72	85	8·72
4	45	14·33	14	2·12	59	6·05
5	62	19·74	155	23·48	217	22·27
6	132	42·03	350	53·03	482	49·48

We accept the cases in the first four classes as diagnosed; those in the last two classes are undiagnosed or undiagnosable. We do not desire to place undue value on the diagnosis of a disease as compared with the detection and interpretation of a symptom.

The following table shows the proportions of diagnosed cases in the various lists:—

	Institute.	Private.	Total.
Number of cases	314	660	974
Cases diagnosed	120	155	275
Proportion diagnosed	38·21%	23·48%	28·23%

The marked difference between the proportions in the Institute and private lists is due to the large number of Class 4 cases brought to the Institute.

The following figures show the results obtained by retaining all the cases which passed under review and including in Class 1 all those previously rejected as trifling or obvious. We are now dealing with all the conditions on account of which the doctor is consulted, for notes were kept even of slight cuts, toothache, and wax in the ears. The Institute list is unaffected as none of the Institute cases were omitted.

	Institute.	Private.	Total.
Number of cases	314	794	1108
Cases diagnosed	120	289	409
Proportion diagnosed ..	38·21%	36·40%	36·90%

Conclusions.

Although there is much room for difference of opinion with regard to the allocation of a particular case to a particular class, it was found that after much reconsideration of the cases and transferences from one class to another the proportions in the various classes varied to a very small extent. The most marked features in the results of the investigation are:—

1. The demonstration of the chaotic condition of the present classification of diseases.
2. The small proportion of diagnosed cases, even when these include all the cases in which the diagnosis was self-evident.
3. The small proportion of cases in Class 1, even when there are included in it all the obvious and trifling cases.
4. The very large proportion of cases in Class 6.

THE PSYCHO-PATHOLOGY OF PULMONARY TUBERCULOSIS,

WITH SPECIAL REFERENCE TO TREATMENT.

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ALTHOUGH there is probably no disease in which mind and body are in such close co-relation, it is altogether surprising to note how little attention has been paid to this intimacy of association, more especially as affecting the treatment of pulmonary tuberculosis; while in the matter of prognosis the psychic make-up of the patient, and his mental outlook, are also factors of no small significance. In this connexion I do not now especially refer to that state of euphoria in advanced cases so dwelt upon by a certain type of novelist, and popularly known as the "spes phthisica"—which is not the mental habit of the average patient suffering from pulmonary tuberculosis—but to certain well-recognised and clearly defined psychic changes, which are the accompaniments of this disease. I am fully aware of the fact that there are differences of opinion on the question as to whether the psychology of the phthisical patient diverges to any greater extent from the normal than in the case of certain other prolonged and debilitating illnesses; but my own experience, and I think that of many observers, goes to show that there is what may be called a specific psychoneurosis in pulmonary tuberculosis. By some, this has been grouped under three headings: (1) The hereditary type; (2) chronic phthisical type; (3) advanced type. It has further been suggested—adopting Freudian terms—that in place of sex-consciousness, there is what has been described as a sense of "organ insufficiency." It is no part of my intention, however, in these remarks to elaborate this side of the question; I wish rather to call attention to certain well-marked features of the psychic state of the average phthisical patient, and to see in what way these bear upon, and can be influenced by, treatment.

In general the mental reactions of the phthisical patient may be said to indicate a reversion to the congenital or infantile type, and such suppression or modification of these as may have resulted from environment and education is largely abolished. While many become introspective, selfish, egocentric, weak-willed, and lacking in self-control, it must be added that not a few become morally stronger as a result of the self-abnegation called forth in the course of the long battle for health. It is not surprising indeed that, in a disease so protracted in the average case, we find undermining of the will-power and a less complete control of the emotional side. It is still an open question whether these changes indeed are to be regarded as a result of the debilitating effects of the disease, or as consequent upon the specific action of the endotoxins of the bacillus tuberculosis. It does not appear to me inappropriate, in this connexion, to refer to certain other very definite psychic and intellectual changes which in some instances are a marked feature of this disease. There seems no reason to doubt, for instance, that even in those of just ordinary intellectual attainments, there is at times a species of mental exaltation with an added keenness of intellect of which no adequate explanation has been offered unless we accept it as resulting from the prolonged intoxication set up by the endotoxins of the bacillus. In those of literary and artistic attainments this psychic and mental excitation has been found to occur in marked degree, and in the long and tragic roll of men and women of genius who have suffered from this disease nothing is more striking than the fact that the creative powers of the mind have been at their highest at a time when the disease was active and progressive. Art and literature would have been indeed impoverished without the names of Keats, Chopin, Charlotte Brontë, Stevenson, Symonds and Francis Thompson, to mention only a few of the army of stricken genius. Explain it how we may, there can be little doubt, I think, that in some remarkable manner, enhanced productivity, quickened intellect, and imaginative power, have marked the trail of the tubercle bacillus in such persons. Although possibly in the nature of a digression, these facts are of much interest in a study of the psychology of this disease.

"Suggestibility" of the Condition.

With the exception of the functional neuroses there is perhaps no disease in which susceptibility to suggestion is so high as in pulmonary tuberculosis—a point I wish to emphasise—and in few diseases can this "suggestibility" be utilised so potently for good or evil. As illustrating this perhaps two typical instances well known to everyone may be mentioned. The first which, for want of a better term, comes under the heading of "auto-suggestion," is seen in certain advanced cases with pronounced toxæmia and high temperature. In these cases the patient expresses himself as "feeling splendid," and is engrossed in plans for some big commercial enterprise, a trip round the world, or even a matrimonial venture. The other is a simple example of "hetero-suggestion" in the case of a patient who has been under treatment by tuberculin, and in whom the subcutaneous injection of sterile water is followed by a febrile reaction in all particulars identical with that produced by the administration of tuberculin.

Unfortunately this high degree of "suggestibility" has often opened the door for the exploitation of the victims of this disease at the hands of the charlatan with his infallible "cure" for consumption, and the "treatment" in these cases is too frequently carried out by the patient with a faithful, if pathetic, persistency. But are we as a profession entirely above reproach in this matter? What is to be said of the ever-lengthening array of remedies, from Koch's tuberculin onwards, which have from time to time been hailed as specifics? Have we not as a profession adopted and fathered them with a too easy credulity,

accepting as "good results" of treatment what has really been a natural staying of the progress of the disease which would have occurred in any case? We have to acknowledge that so far we have discovered no remedy which is specific for tuberculosis in the sense that quinine is specific for malaria and salvarsan for syphilis; and that, in a disease so chronic in its incidence, so capricious in its ebb and flow, such a specific is still to seek.

Uses of Drugs.

But even if this is the case, it is by no means correct to assert, as some have done, that medication plays no useful part in the treatment of pulmonary tuberculosis, a point strongly emphasised by Rénon. The exhibition of certain drugs is of undoubted benefit in many cases; here, too, suggestion plays an even more important part than in most diseases. In this connexion Baudouin quotes some interesting observations of Rénon, which go to show that a comparison of the results obtained by the various methods of treatment in chronic pulmonary tuberculosis displays the same proportion of cases cured or alleviated, cases in which there was no improvement, and cases in which the disease had progressed in spite of treatment. He describes this as "the normal coefficient of amelioration" and enunciates the view that every new method for the treatment of chronic pulmonary tuberculosis, provided that it is harmless, will give satisfactory results. In other words, if the physician himself believes in the remedy, a psycho-therapeutic state is induced, and the medicament is merely the vehicle of suggestion. These remarks, however, must be qualified by the statement that, in my opinion, the abuse of certain drugs has been responsible for a good deal of that dyspepsia which is so often such a distressing feature of the disease. Truly it may be said that the phthisical patient fights for his life "upon his stomach," and that if this is thrown out of gear, his chances of recovery are materially lessened.

Psychotherapy and Organic Disease.

Have we then done all that is possible up to the present for patients suffering from this disease who are placed under our care in sanatoriums or otherwise? I do not think so. I believe we have in psychotherapy a remedy for the alleviation at least of many of the distressing accompaniments of this disease, and one which can materially assist our efforts for the patient's restoration to a moderate degree of health, with arrest of the progress of the disease. It may fairly be asked what part can be played by psychotherapy in an organic disease of this nature. Although Krafft-Ebing and Forel are stated to have carried out certain experiments intended to show that organic changes can be brought about by suggestion, they have had to admit that the results were not very satisfying; it is, I think, also generally acknowledged by psychotherapists that this form of treatment cannot *directly* affect morbid organic changes. But even if this fact is admitted, we should not, I think, strain the law of psycho-physical parallelism by assuming the close co-relation in disease of the psychic factor and the bodily functions—in short, by holding that psychotherapy can in fact react favourably upon the purely physical side of such a disease as pulmonary tuberculosis.

Psychotherapy in its Application to Phthisis.

I propose briefly to mention a few of the conditions for which psychotherapeutic treatment might be advantageously employed in phthisical patients. I have already alluded to the frequent and characteristic reversion to infantile mental reactions which occurs in these patients, in whom re-education of the will—and often restoration of the whole ethical code—is so necessary when in favourable cases the patient is again able to compete in the struggle of life. In some cases again a confusional state exists, with ideas of a persecutory character; while depressive states are by no means rare. The fear of hæmoptysis becomes almost an obsession sometimes, the unhappy patient daily scrutinising the expectoration with painful anxiety. Dyspepsias of a functional character, inability to take certain essential articles of diet, and sometimes insomnia, as well as the control of cough, also come within the scope of treatment by psycho-therapeutic means.

In a certain proportion of cases there also exists, as might be expected—more especially in the intelligent and sensitive type of patient—a state of mental conflict which prejudices the treatment and retards recovery. In a few of these cases treatment by psycho-analysis may even be necessary; and I think this treatment can be most suitably carried out at a sanatorium. There are those who say that the sanatorium has outlived its usefulness, and has in many ways proved an expensive fraud; but is this in fact the case? There are certainly grave defects in our sanatorium methods which might be enlarged upon, but I am only here concerned with such defects or deficiencies as bear upon actual treatment.

Necessity of Individual Treatment in Phthisis.

Pulmonary tuberculosis is above all a disease requiring individual treatment, and the inevitable tendency to standardise everything in connexion with the patient in a large sanatorium—the administration of what may be called "massed" treatment—is from every point of view unsatisfactory. Speaking generally, this applies to medication, dietary, and exercise. Occupational therapy has been a step in the right direction from the point of view of re-education on the physical side; but, recalling the law of psycho-physical parallelism, re-education on the mental side for the psychic defects already enumerated is of no less importance. I am firmly of opinion that when a patient is admitted to a sanatorium, in addition to the ordinary medical history of the case, the fullest details of the patient's family and personal *mental* history should be sought. A fuller knowledge of the personality of the patient than is now ordinarily obtained is essential. This having been obtained, such treatment as may be found necessary after due observation, either in the form of mental exercise and relaxation, or more specifically as psychotherapy, and in certain cases psycho-analysis, should be duly instituted. The results obtained at the New Nancy School presided over by Edouard Coué, in which auto-suggestion is more specifically employed and in which a number of cases of pulmonary tuberculosis are included, provide remarkable proofs of the value of psychotherapy in this disease. There is certainly sufficient evidence to warrant a wider and more systematic use of this form of treatment in pulmonary tuberculosis. It is too much to expect that the medical superintendent of a large sanatorium, immersed as he is in the routine duties of his position, can deal with this side of the question even if qualified to do so, which he seldom is. The fact is that for the most part our sanatoriums, judged by the criterion of such an institution as the Loomis Sanatorium in America, are woefully understaffed. In the larger institutions one of the staff should possess the necessary qualifications for psychotherapeutic treatment in addition to his special knowledge of tuberculosis, and in the case of the smaller sanatoriums, such special knowledge on the part of the medical superintendent should be regarded as essential. It is to be assumed, of course, that in every case the physician in charge is himself equipped with the fundamental personal qualities of confidence in himself and his work, a spirit of cheerful optimism and of infinite patience, without which the management of the phthisical patient, always difficult, becomes well-nigh impossible.

By such means those who are able to leave the sanatorium with the disease arrested will again be able to play a part in the life of the community with renewed self-confidence, with will power restored, and with a broader and more optimistic outlook on life; while even those for whom our efforts are unavailing may be enabled to face with fortitude the termination of their sufferings.

THE USE OF LUMINAL SODIUM IN EPILEPSY.

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THE history of the drug treatment of epilepsy is not an encouraging one. "There is scarcely a substance in the world," says Sieveking, "capable of passing through the gullet of man, that has not at one time or another enjoyed the reputation of being anti-epileptic," and it may appear rather an impertinence to report upon yet another drug to be eulogised, tested, doubted, and perhaps ultimately discarded like so many of its predecessors. This paper is, indeed, no more than a preliminary note on the use of luminal sodium, and much more extensive trials over long periods are required before the value of the drug can be finally estimated.

Method of Use.

Luminal was first tried in Germany in 1912, and has been fairly widely used, but I have not come across any record of the results obtained from it in England.

Luminal is phenylethylmalonylurea, or a derivative of veronal in which one of the ethyl groups is replaced by a phenyl radicle. Luminal sodium is a soluble derivative of luminal, and I have given it in solution, with hot milk or water, in doses of 1 to 2 grains once a day, usually at bedtime. The dosage is small as compared with that of Continental observers, who consider that 3 to 4½ grains can safely be given to adults over prolonged periods, provided that the patients are under adequate supervision. For the purposes of investigation 16 cases of ordinary epilepsy in children or adolescents were chosen; the patients were all liable to major attacks at fairly regular intervals, and none showed signs of marked mental defect or deterioration. It is essential to confine statistical investigation to patients whose fits show a regular incidence, unless very long periods of time are under review. Most of the patients were taking bromide when the luminal was started, and the daily dose, which in no cases exceeded 30 grains, was continued. This course was, no doubt, open to some objection, but had it not been followed, it would have been impossible to say whether any modification of the fit incidence was due to deprivation of bromide or to the luminal sodium. In this connexion it is perhaps worth mentioning that I have known stoppage of bromide to be followed by a considerable lessening in the number of fits. All the patients were under the continuous supervision, both by day and night, of experienced nurses or attendants, so that the fit statistics should be complete. (See table.)

Table showing the Effect of Luminal Sodium upon the Fit Incidence of 16 Young Epileptics.

Initials.	Sex.	Age.	Daily dose of L.S. in grains.	Fit incidence. 6 months prior to commencement of administration.						First 3 months of administration.			Average fit incidence: 6 months prior.	Average fit incidence: 3 months of admn.	Lb. weight gained or lost.
A. E. S. ..	M.	18	2	1	8	5	4	5	3	1	1	1	4·3	1·0	+8
Y. L.	M.	22	2	7	3	0	12	10	9	0	0	0	6·8	0·0	+8
C. J. F. ..	M.	16	2	4	6	13	6	8	8	3	3	6	7·5	4·0	+8
A. E. C. ..	M.	17	2	10	13	11	8	5	11	3	0	4	9·7	2·3	+7
L. J. H. ..	M.	13	2*	4	8	2	1	4	8	1	4	5	4·5	3·3	+2½
E. G. T. ..	M.	21	2	6	5	5	7	7	6	0	1	1	6·0	0·7	−5½
C. W. S. ..	M.	19	2	9	8	12	9	8	6	4	7	5	8·7	5·3	+7
L. T. H. ..	M.	15	2	1	5	9	5	9	10	0	0	7	6·5	2·3	+6
E. A. O. ..	M.	11	1½	11	8	6	3	8	8	1	0	0	7·3	0·3	+5½
C. H. C. ..	M.	12	2	2	6	8	11	12	11	4	2	8	8·3	4·7	+5½
R. G. S. ..	M.	12	1½	4	4	3	4	6	4	0	0	0	4·2	0·0	+1
R. S.	M.	11	1½*	8	9	7	8	10	11	6	4	4	8·8	4·7	+5
N. E. P. ..	F.	14	2	6	6	7	5	7	5	3	4	5	6·0	4·0	+2½
L. C. D. ..	F.	15	2	5	5	5	5	9	8	4	5	7	6·2	5·3	+1
A. G.	F.	15	2	7	7	7	8	9	7	6	0	0	7·5	2·0	+10
H. H.	M.	20	2	3	3	2	2	3	1	2	0	0	2·3	0·7	+7

* Reduced to 1 gr.

Advantages of Luminal Sodium.

Attention may be particularly called to two points in the figures shown. In the first place there is a marked reduction in the fit incidence in every case. This uniformity of reaction to the drug places it, I believe, in a category apart from other anti-epileptic remedies. I have drawn up and published elsewhere similar tables dealing with the effects of belladonna, digitalis, and borax upon epilepsy, and they show no such uniformity of reaction. Borax, indeed, is the only one of the three which appears, when the figures are studied in bulk, to have any effect at all in the reduction of fit incidence. Various statistics of the fit incidence under the influence of bromide have also been published, but I have seen none with beneficial results so uniform as in this table. This point is worth stressing, because it is a matter of common knowledge that marked benefit, or even a complete arrest of fits, may follow the adoption of any new line of treatment, therapeutic or dietetic, or from a chance change in the environment of any individual patient. Secondly, the considerable increase in weight that occurred in almost every case can be no mere coincidence. The average increase of the 16 cases works out at just under 5 lb., and it will be noted that only in one case is a loss of weight recorded.

So much for the advantages of the drug. Are there any drawbacks to its use? Careful observation was made of the mental and physical conditions of all the patients. In no case was complaint made of headache or abdominal pain; nor were there any acute outbursts of excitement such as have been recorded by Continental observers. In 5 of the 16 cases the general mental condition of the patients was apparently unchanged; in 3 the patients were reported as rather more irritable than formerly, while in 4 they were evidently more cheerful and alert. One case, L. C. D., a girl of 15, has become distinctly more dull since taking luminal sodium; her speech is hesitating and she appears to have trouble in finding her words. It is to be noted that her fit record shows less improvement than that of any of the other patients, and that her increase in weight is correspondingly small. Two boys, L. J. H., aged 13, and R. S., aged 11, became sleepy after taking the drug for a few days. In both cases the dose was probably too large, and improvement followed on its reduction. Finally in the fourth month of administration one boy, C. H. C., aged 12, became very dull and lethargic, and could only with difficulty be persuaded to eat his food. The drug was stopped and the boy began to get back to his normal condition some days later; but as he had an exactly similar attack some time ago it does not seem reasonable to ascribe his condition to the luminal sodium.

Best Results in Cases with Major Attacks.

As in the case of other drugs, luminal sodium seems to give best results in cases liable to major epileptic attacks; cases who suffer from momentary losses of consciousness, or from periodic short attacks of altered consciousness with automatism, are notoriously inaccessible to drug treatment. Nevertheless there is recorded a diminution of momentary attacks in three

of the patients in the table who were liable to them; and one of the most satisfactory cases we have had is that of a boy aged 9 who was liable to very frequent psychic attacks with automatic movements, the number and duration of whose attacks have been very greatly diminished by three months of luminal treatment, and who has become, as a consequence, very much brighter mentally.

The modern view of the psycho-genetic origin of epilepsy has led some writers to discount the value of any treatment directed to reducing the fit incidence or arresting the fits. Fits are said to be protective reactions away from an environment to which the epileptic, with his egocentric sensitive temperament, cannot adapt himself, and to stop fits is to court further mental trouble. I have seen mental disturbance follow the sudden cessation of fits in an old-standing case of epilepsy, but more commonly the patient becomes more alert and cheerful when his fits stop, and I have no fear that in using a drug that will arrest fits we are doing the patient any disservice, provided that we are satisfied that the drug itself has no prejudicial effect upon him. It is, of course, not claimed that luminal sodium, or any other drug, has any curative effect upon the disease; at best it only arrests or lessens the frequency of the convulsive attacks.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

PURULENT PERICARDITIS SIMULATING ANGINA PECTORIS.

BY M. A. CASSIDY, M.D. CANTAB., F.R.C.P. LOND.,
R. O MOON, M.D. OXON., F.R.C.P. LOND.,
AND
F. LE Q. PELLY, M.B., B.CH. ABERD.

THE following case presented such difficulty in diagnosis that it seems worthy of record.

K. D., aged 42, a caterer by occupation, a hearty eater, but not addicted to alcoholic excess, and a very heavy cigarette smoker, had three separate attacks of gonorrhœa during the last two years; apart from this he had been in robust health till May 18th, when he was seen to be standing still, looking very white, and perspiring freely. He was assisted to his room, where he collapsed on the floor. Dr. Pelly arrived shortly afterwards and found him in an almost moribund condition. His face was ashy and sweating; no pulse could be felt, the heart sounds were barely audible, respiration was rapid and laboured; when the patient was able to speak he complained of agonising præcordial pain. There was very little change in his condition half-an-hour later when Dr. Cassidy saw him. The heart sounds were still heard with difficulty, and the pulse could not be felt; the heart was apparently beating feebly and irregularly at a rate of about 50. Strychnine and camphor were injected, with but little improvement, but there was prompt response to amyl nitrite, several capsules of which were administered. After this the pulse improved in volume and became regular, and the pain, which the patient was now able to describe as radiating down both arms, with greater severity in the left arm, diminished in intensity. ¼ gr. morphia and 1/100 gr. atropine were now administered hypodermically with further improvement. During the night he vomited freely, and again complained of severe præcordial pain, but next morning improved sufficiently to be moved into a nursing home. On the 20th he had a fairly comfortable day, but in the evening his temperature rose to 99·8°F. On the 21st he had two syncopal attacks, one associated with angina-like pain. When seen by Drs. Moon, Cassidy, and Pelly in consultation on the evening of the 21st the temperature was 100·4°, pulse 86, respirations 30; the radial artery was much thickened and the tension high. No increase of cardiac dullness could be made out, and the heart sounds appeared to be normal, though earlier in the day Dr. Pelly had heard pericardial friction. There was a little dullness and quiet breathing, with nasal voice sounds, at the extreme base of the right lung. He still complained of slight præcordial pain, but appeared to be in no great distress, could talk quite freely, and was able to sit up in bed for examination. At 11 P.M. that evening there was a sudden fatal syncope.

At the autopsy on the following day the pericardium was found to contain about 2 oz. hæmorrhagic sero-purulent fluid, and both the parietal and visceral pericardium were covered with punctate hæmorrhages and patches of lymph. The valves of the heart appeared to be perfectly normal, but there was well-marked recent atheroma of the aorta just above the aortic valves. The right lower lobe of the lung was congested and collapsed, but no other signs of organic disease were discovered. Unfortunately, no bacteriological examination was possible.

Remarks.

In this case the onset was typical of severe angina pectoris, and the subsequent syncopal attacks, one with pain, also seemed to support this diagnosis. In view of the condition of the root of the aorta it seems probable that he was in fact killed by angina pectoris, though this condition was excited by an unrecognised pericarditis. The pyrexia, furred tongue, and transient friction, coupled with basal pulmonary collapse (due, no doubt, to diaphragmatic arrest), should have led us to the correct diagnosis. In the absence of any other septic focus, it seems probable that the pericarditis was due to gonococcal infection.

NOTE ON EARLY PROGRESS OF AN INFANT OF ABNORMALLY SMALL WEIGHT.

BY F. CHURCHILL DAVIDSON, M.B., CH.B. EDIN.,
D.P.H. OXON.

THE following case is of interest in that the infant weighed only 22 oz. at birth.

Mrs. X., a multipara, aged 34, who had been married ten years, gave birth on July 4th, 1921, to a male child weighing 1 lb. 6 oz. Calculating from the date of the last menstrual period, period of gestation was 34 weeks; but taking into consideration both the possible margin of error of 3 weeks—corresponding to the length of menstrual interval—and the appearances of the child at birth, this gestation period appears to have been over-estimated, and it is most probable that the period was only 32 weeks.

Previous history.—1. Miscarriage at third month in 1911. 2. A female child was born Feb. 10th, 1920, and lived for three days. Cause of death stated to have been "prematurity" (7 months). Both parents are apparently healthy.

Present history.—Labour was uncomplicated and completed in five and a half hours; normal head presentation.

Condition of child at birth.—The weight was 1 lb. 6 oz., and the length 15 in. The arms and legs were nearly equal in length; umbilicus was situated close above pubis; sex characters (male) were fully developed; skin was wrinkled and of bright flesh colour; eyebrows and eyelashes were developed and eyelids opened occasionally; there was dark hair on head and downy hair on body. The following herniæ were present: slight umbilical hernia, R. inguinal hernia, large L. scrotal hernia (latter reducible and retained by wool truss). Phimosis was also present and dorsal incision was made on July 12th.

Photograph of child taken at end of fourth week.

Treatment.—The child was immediately covered with warm olive oil, wrapped in cotton-wool and placed in oven at temperature of 90°F. until extemporised incubator was prepared. This latter consisted of a wicker basket with three hot-water bottles placed round the child. A temperature of 85° was maintained, as recorded by bath thermometer placed between blankets beside child and checked from time to time. Hot bottles were refilled alternately.

Feeding.—For the first 48 hours the child was fed hourly with small quantities of a whey and cream mixture (3 oz. in 24 hours) and on third day feeding with breast milk was commenced. The child was laid to breast at feed times from

birth as a routine although too weak to suckle. Immediately after the establishment of lactation on third day breast pump was used and breast milk so withdrawn was given to child by pipette or spoon—a drachm every two hours for first few days—increased gradually in three weeks to six drachms every three hours.

Progress has been uninterrupted, as shown by the marked increase in weight. There has been no vomiting or diarrhœa since birth; stools have always been normal.

Weight.—At birth, 1 lb. 6 oz.; end of first week, not recorded; end of second week, 1 lb. 14 oz.; end of third week, 2 lb. 10 oz.; end of fourth week, 3 lb. ½ oz.

The whole case is interesting in that various authorities, including Budin of Paris, have stated that mortality of premature babies weighing under 3 lb. is 100 per cent., and also as emphasising the importance of breast feeding in premature babies. It is especially in the first few days of lactation that the child derives from mother's milk those immune bodies which are capable of protecting it against infections of all kinds.

A CASE OF BULLOUS ERUPTION CAUSED BY MAY-WEED.

BY J. H. SEQUEIRA, M.D., F.R.C.P. LOND., F.R.C.S. ENG.,
PHYSICIAN, SKIN DEPARTMENT, LONDON HOSPITAL

THE attention recently called to plant dermatitis and the fact that this is the first case of its type seen in my clinic at the London Hospital has led me to publish this note.

On June 30th, 1921, a married woman, aged 51, presented herself at the Skin Department at the London Hospital with a remarkable eruption of blebs on the left elbow and both wrists. She was a strong, healthy woman, and her face, forearms, and hands were deeply tanned by the sun. She had been engaged in pea-picking in Essex. It was difficult to get exact dates, but apparently the eruption for which she consulted me had come on acutely two or three days before. When examined she had an enormous, irregular, flaccid blister over the left elbow, extending down the back of the forearm for 3½ to 4 inches. A similar bleb, 3 inches in its long diameter and from 1 to 2 inches wide, was present over the ulnar side of the back of the left wrist, and a rather larger bulla over the ulnar aspect of the back of the right wrist. The fluid in the blebs was clear serum and there was no zone of erythema round them (Figs. 1 and 2). The patient complained of pain and some irritation. She ascribed the lesions to poisoning with May-weed, a common field-weed. Abrasions, produced by her occupation of pea-picking, apparently preceded the lesions. She described other cases amongst workers similarly employed, and on inquiry in South Essex I obtained a history of other cases in which individuals had been obliged to give up work for some weeks. Inquiries made for me in Kent elicited the same information.

FIG. 1. FIG. 2.
Showing the bullous eruption (1) on left forearm and hand; (2) on right hand.

The lesions were dressed with a powder of zinc, starch, and calomel and speedily healed.

Remarks.

In Bernhard Smith's work on "Poisonous Plants of All Countries" (p. 73) *Anthemis cotula* (May-weed) is included in the appendix of plants "reputed to be poisonous." In Maisch's "Manual of Materia Medica," seventh edition, p. 260, *Anthemis cotula*, May-weed, wild chamomile, belonging to the natural order Compositæ, Anthemidæ is described as having an unpleasant aromatic odour, bitter acrid taste. Its constituents are a volatile oil, valerianic acid, acrid fat, tannin, anthemidine (?), anthemic acid (crystalline, bitter, soluble in ether). Valerianic acid is classed as an irritant by B. Smith (loc. cit.).

I obtained some fairly fresh plants and rubbed the juice of the leaves and flowers into my forearm, both into the unbroken surface and into a scarified area. In the spots treated with the juice of the leaves a rather tender papule developed the same evening, both in the scarified and unbroken parts. The papules lasted for five days and cleared up, leaving no mark. There was no vesication. The specimen weed had been gathered 12 hours, and it is possible that the plant is more virulent at certain times than others.

A CASE OF CONGENITAL ABSENCE OF RIGHT PECTORALIS MAJOR.

BY A. G. MILLOTT SEVERN, M.D. BRUX., M.R.C.S., F.C.S.,
PATHOLOGIST, EAST SUSSEX COUNTY MENTAL HOSPITAL.

A POST-MORTEM examination performed at the Royal Sussex County Hospital on a man, aged 44 years, who died from perforated gastric ulcer, showed complete absence of the right pectoralis major, including both the pars sterno-costalis and the pars clavicularis. There was no remnant of muscular tissue or fascial band to be found; the ribs were normal, being covered only by the skin and subcutaneous tissue where the pars sterno-costalis should be; the condition may therefore be assumed to have been congenital. The right pectoralis minor and both the pectoral muscles on the left side were present and well developed, and there was no other muscular deficiency or abnormality of the thorax.

Absence of all or part of the pectoralis major on one or both sides is decidedly rare, but Bing and other anatomists have stated that variations occur more often in the pectoral group than in any other of the skeletal muscles—after allowing that abnormality of the pectorals is more easily detected than is the case with other smaller or less apparent muscles. Developmentally this group of muscles is among the last to be acquired, and therefore one would expect to find in them the most frequent variation. In this case the condition had apparently caused but little disability during life, for the man had followed a laborious occupation; in fact, in most of the recorded cases where pectoral muscle abnormalities were not associated with other deformities, no inconvenience or functional weakness was observed on account of the muscular deficiency—the deltoid and other shoulder muscles sufficing for all the movements of the arm.

These observations tend to show how good a functional result may be expected in a patient whose pectoral muscles have been removed for malignancy.

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Reviews and Notices of Books.

SURGICAL THERAPEUTICS AND OPERATIVE TECHNIQUE. By E. DOYEN. English edition prepared by the Author in collaboration with H. SPENCER-BROWNE. Vol. III.: Operations on the Abdomen. London: Baillière, Tindall and Cox. 1920. With 959 illustrations. Pp. 811. 45s.

THIS is the last volume of a great work. Doyen was a surgical genius, some of whose characteristics did not make for popularity amongst his professional brethren, but no one can deny that he contributed largely to the advance of surgery by his inventive ingenuity, boldness, and skill. He placed his stamp upon everything that he touched. Originality of method, frequently and justly claimed in this volume for its author, has its drawbacks in that a method good in itself may be used on occasions when classical technique would be preferable. For example, the method of crushing pedicles was largely perfected by Doyen, but to recommend the use of an écraseur to crush the prepuce prior to its removal in a simple circumcision is surely to ride a hobby a little too far.

The first half of the volume deals with operations on the abdominal wall, the liver, peritoneum, stomach, and intestines; the second half treats of genito-urinary operations in both male and female. The section on the stomach and intestines is by far the best, though the author gives a very meagre description of certain conditions, notably the hour-glass stomach. The illustrations of the various forms of anastomosis are plentiful and clear. The section on liver and gall-bladder is not so good. For example, in connexion with liver abscess, we find the dogmatic assertion: "All punctures, even of an exploratory nature, are dangerous," whilst treatment of a liver abscess by aspiration is not even mentioned. Again, Doyen recommends that where possible the gall-bladder should be removed extra-peritoneally by subserous decortication, a procedure which is either impossible or unnecessary if drainage be provided. In view of the usual instructions for performing cholecystostomy it is strange to find an illustration showing the mucous membrane of the gall-bladder stitched to the skin (Fig. 120). The section on genito-urinary surgery in the male is less adequate than that dealing with the female. The only operation described for hydrocele is that of inversion of the sac. For ectopia vesicæ the method of reconstruction of the bladder by skin flaps is described and illustrated, whilst the transplantation of the trigone and ureters into the sigmoid or rectum receives no mention. Concerning hypertrophy of the prostate the author states: "I prefer to total prostatectomy the removal of abnormal prostatic fibromata by the suprapubic route, preserving the rest of the gland and wounding the urethra as little as possible." The section on pelvic peritonitis in the male is very interesting. Since the name of Doyen has for many years been better known in connexion with female genito-urinary surgery than with any other branch, it is not surprising to find a long section devoted to this subject. The translator reminds us that here is "much that is of historical interest." He might almost have added "and only of historical interest," for the vaginal route has of late years been almost superseded by the abdominal route for dealing with most female pelvic disorders.

Taking the book as a whole it is an interesting and informative exposition of the methods adopted in abdominal surgery by one of the masters in technique, though the sections are unequal in value and in some cases do not represent the best modern teaching. The illustrations, excellent though they are, are almost too numerous. There are 11 nearly full-page illustrations showing the suture of the abdominal wall after the sac of a hernia has been tied. To show the passage of the first deep suture, the passage of the second deep suture, the first two sutures ready to be tied, and the first two sutures tied, as four separate and large illustrations, improperly assumes a poverty of intellect and wealth of purse in the purchaser of a book on surgery.

We have nothing but praise for the translator, who has used clear and, where desirable, idiomatic English, while preserving the sense of the original.

DANTE. ESSAYS IN COMMEMORATION. 1321–1921. University of London Press. 1921. Pp. 255. 12s. 6d.

Dante, writing to Can Grande, we learn from Mr. Edmund Gardner's contribution to this book, stated that the heads under which criticism of a book should be ranged are as follows: subject, agent, form, end, title of work, and branch of philosophy. Dante's own classification may well be turned to account here. The "subject" is Dante, the man and the writer, treated from widely differing points of view as poet, critic, politician, philosopher, and lover, and shown in relation to his own time, our time, and eternity. The "agents" are thirteen distinguished students of Dante, three Italian and ten English. The exterior "form" of the book is admirable, its printing and illustrations (photographs of William Blake's and Botticelli's illustrations to Dante, and a facsimile page of a fourteenth-century manuscript) being of a quality rarely met with. As to its internal "form," it is necessarily somewhat confused owing to the widely differing nature of the contributions, which include fragments of translations, notes on points of scholarly interest, excerpts from published books, and essays dealing generally with Dante's work, or with particular aspects. The "end" of the publication is the celebration of the sexcentenary of Dante, which is this year being observed in Italy and all civilised countries.

The title-page bears the sub-heading "1321–1921," but not many of the contributors have drawn their inspiration from the idea of the permanency of Dante's value or of its special application to present circumstances. Lord Bryce, however, does attempt this, and in a most interesting essay called "Some Thoughts on Dante in Relation to Our Own Time" discovers analogies between that distant age and our own. One was, and the other is, a period of disillusionment. The nobler souls of the thirteenth century felt bitterly the failure of the various attempts that had been set afoot to base the policy of Emperor and Pope, the two arms of Holy Church, on a higher ground than that of mere interest. They had seen the great ideas that had animated S. Francis and S. Dominic and the metaphysicians of Bologna exert only a limited influence, and fail to secure that rebirth of conscience and divine charity by which alone a better state of things could be compassed. In 1921 those who looked to the "war to end war" as a means of elevating world politics to a less debased sphere of action must feel a similar bitterness, but Dante shines down through the ages with the message that hope and reason must finally triumph against unfaith and stupidity.

Signor Benedetto Croce's contribution is an excerpt from his recently published work "La Poesia di Dante," shortly to be published in English translation; it is here printed in Italian. This chapter really needs the context of the whole book to be properly intelligible. Signor Croce emphasises the unity of spirit underlying the work of Dante: he was a man who brought to politics, to love, to literature, and to religion the same robust personality, informed by the same cosmic doctrines, and vigorously realising itself, without loss of sincerity in any, in all of these branches at the same time. How difficult, one must reflect, would it be to-day to evolve a standard or set of standards equally applicable to politics and to the life of the soul. In such an age as ours those who give themselves to politics succeed generally because they have no life of the soul, while those who value an unsullied conscience keep well clear of the world's

affairs. Dante remains with us to tell us how false is such a divorce. Only by bringing the same clearness of soul to politics as to personal relations, only by rooting our politics in a great consciousness of the full value of life, can true peace be attained. How eagerly Dante was concerned with the literary and stylistic problems of his day, how far he was from scorning the humbler problems of language and syntax from the height of his towering majesty of thought, is made apparent by Mr. Gardner's essay on "Dante as Critic." Literary criticism of a most pertinent description is embedded in the "Divine Comedy," while the "Vita Nuova," apart from its anatomical analyses of the lyrical poems incorporated in it, contains a lengthy digression on the poet's licence for personalising abstractions. Dante's importance as a politician is further emphasised in Mr. Wicksteed's essay "Dante and the Latin Poets," wherein the noble name of Virgil is added to the list of pre-eminently political poets, while in Mr. Mackail's "Dante and Virgil" is quoted the verse of Dante which has been most used in political controversy these last days—

> "A Pola presso del Quarnaro
> Che Italia chiude e suoi termini bagna;"

than which denial of the "Italianità" of Fiume the very Serbs could not find a more decisive statement to give lustre to their case.

Mr. A. G. Ferrers-Howell in "Dante and the Troubadours" explains the theories of chivalrous and transcendent love which provided the shell of the "Vita Nuova," and shows to what an extent Dante owed his mastery of the short lyric to the study of the Provencal court poets.

As to the two remaining heads of criticism, the name of the work stands at the head of this review, but the branch of philosophy to which the whole belongs is a problem that would have puzzled Dante himself in the solution—and, for that matter, to what branch of philosophy would he have assigned his own immortal poem, of which this book is the shadow?

THE NEW STONE AGE IN NORTHERN EUROPE. By JOHN M. TYLER, Professor Emeritus of Biology, Amherst College. London: G. Bell and Sons, Ltd. 1921. Pp. 310. 15*s*.

THE study of early races must always be a fascinating one, and innumerable books have been and continue to be written thereon. Professor Tyler's unassuming work is, as he tells us in his preface, prepared for young students, and is merely to be considered as a good host who introduces "intelligent, thoughtful, and puzzled readers to the company and viewpoint of the pre-historian." Hence the extensive bibliography, which will afford ample food for the student. Prof. Tyler discusses in his first chapter the coming of Man, refers to Pithecanthropus, and states that "we still lack foundations for any hypotheses as to exactly when, where, or how the erect ancestral ape-man emerged into real manhood." Anyway, primitive man appears to have started life in "the whole of the parkland zone curving around the western buttresses of the plateau of Thibet," a region which elsewhere Prof. Tyler calls the Iranian plateau. From this plateau early man migrated to India, to Northern Africa through what are now Mesopotamia, Palestine, and Egypt, through Asia Minor to the Ægean, and westward and north of the Caspian through Southern Russia to the Carpathians. From Africa he also passed into Europe by means of the then existing land bridges at Gibraltar and Sicily—South Italy.

It was at some time during the Glacial Epoch that man first arrived in Europe, when the ice sheet extended roughly as far as lat. 50° N. Then began the Eolithic Period, which was followed by the Early and Late Palæolithic Periods; the Eolithic and Palæolithic Periods correspond roughly to the Pleistocene Period of Geology. In succession followed the Neolithic Period, with which Prof. Tyler's book deals, but it was during the Late Palæolithic Period that that wonderful race, the Cro-Magnon people lived. The discovery of skeletons in 1868 of this race gave a check to the Darwinian theory that man got progressively more ape-like as one went further back in time, for the skeletons discovered were those of tall men from 5 ft. 11 in. to over 6 ft. That of the one woman, who was young, measured 5 ft. 3 in. The artistic powers of man were developed already, as is evident by the drawings in the cave dwellings of Southern France and the Pyrenees; but this brilliant race died out, and the Neolithic people succeeded them. These lived at the time when the ice sheet had retreated, for their remains are found in the shell heaps of places in Europe as far north as Denmark. Prof. Tyler gives a very readable account of Neolithic man and his ways, his habitations, his industries, and his migrations, concluding with a chapter on the Indo-Europeans, whose culture and life, he says, were a product of Neolithic experience and a blossoming of Neolithic growth. The book is a useful introduction to a very complicated study, and we would add one work to Prof. Tyler's bibliography, namely, Prof. Lionel Lyde's "Continent of Europe," especially the first ten chapters thereof.

CHEMISTRY.

The Chemistry of Enzyme Actions. By K. G. FALK. New York: The Chemical Catalogue Company. 1921. Pp. 136.

THE publication of this volume marks an interesting departure in the literary activity of the American Chemical Society, its essential object being the development of a chemical literature in the English language without regard to the usual commercial considerations of book publishing. By an arrangement with the Inter-Allied Conference of Pure and Applied Chemistry in 1919, the society undertook the production and publication of scientific and technological monographs on chemical subjects. At the same time the American Physical Society became responsible for the publication of critical tables of chemical and physical constants. The object of these monographs is to present the knowledge available upon the chosen topic in a readable form intelligible to those whose activities may be along a wholly different line. A second purpose is to promote research in the branch of science covered by the monograph by furnishing a careful survey of the progress already made in that field and by pointing out directions in which investigation needs to be extended.

The author deals with his subject under the following heads: Velocities of Chemical Reaction—General Theory of Chemical Reactions; Catalysis; Chemical Reactions Catalysed by Enzymes, Physical and Chemical Properties common to Enzyme Preparations, Chemical Nature of Certain Enzymes, Mechanism of Enzyme Actions, Uses and Applications of Enzymes; Present Status of Enzyme Problem. To cover so wide a field in one small volume is an ambitious effort, and Dr. Falk has done a service to his brother chemists in coördinating the existing knowledge and presenting it in so readable a form. The last two chapters especially are of quite exceptional interest.

The Chemistry of Synthetic Drugs. Third edition. By PERCY MAY, D.Sc., F.I.C. London: Longmans, Green and Co. 1921. Pp. 248. 12*s*. 6*d*.

THE author's object is to give an account of the main facts concerning the chemical nature of synthetic drugs and the principles guiding their production. New drugs are constantly being put on the market and whilst many of them are well known and widely used their chemical nature is often unknown. Before 1914 the manufacture of synthetic drugs was practically confined to Germany, but since then considerable progress has been made in this country. We hope a further impetus will be given when the Safeguarding of Industries Bill materialises; possibly, then, in the course of a few years we may possess something approaching the highly organised German organic chemical industry.

Dr. May's book will be read with interest both by the medical man and the chemical manufacturer; to the former will appeal the chapters dealing with the theory of the action of synthetic drugs, the chemical changes of drugs in the organism, narcotics and general anæsthetics, antiseptics, &c., and to the latter the method of preparation of the different substances. Many references to current and patent literature are included. The author is to be congratulated on having produced a most useful and up-to-date work. It appears at an opportune time and it should be of particular service to those manufacturers of fine chemicals who contemplate extending their activities to meet the home demand for synthetic drugs.

The New Methods of Blood and Urine Chemistry. Second edition. By R. B. H. GRADWOHL, M.D., and A. J. BLAIVAS. London: Henry Kimpton. 1920. Pp. 418. 30*s*.

THE authors state that they have collected much of the information which has appeared in the journals (mostly American) during the past three or four years. In most cases they have given one method for each test, that one being in their experience the most satisfactory for routine and research work. This frank admission of limitation rather disarms criticism. Otherwise the reviewer would be tempted to draw attention to the omission of many methods which are in common use in European laboratories. The volume is divided into three parts: Technic of Blood Chemistry, Chemical Analysis of Urine, Blood Findings and their Interpretation. It is profusely illustrated and full working details are given of the different tests. A perusal of the book leads to the conclusion that it will be more useful to the medical and chemical specialist on blood and urine than to the general practitioner or student.

AIDS TO OPERATIVE SURGERY.

By H. C. ORRIN, O.B.E., F.R.C.S. Edin. London: Baillière, Tindall and Cox. 1921. Pp. viii. + 236. 6*s*.

THE teaching of operative surgery can hardly be approached in any other way than by practical demonstrations or by well-illustrated and full printed descriptions. Prolonged experience in teaching and operating, and a natural aptitude for detecting the most essential points in an operation, are necessary preliminaries for the production of an unillustrated synopsis of such a subject. We cannot say that Mr. Orrin has completely succeeded in his task, but he has at least made a praiseworthy attempt to present a succinct epitome of the subject. He is wise in stating "that in no possible way can this little volume be used as a substitute for the classical text-books on the subject."

There are many points which might be modified in any future edition. Very few umbilical herniæ can be dealt with by an incision three inches long. It is certainly not the usual custom to irrigate the bladder with hot water during the enucleation of a prostate; the irrigation is reserved till the enucleation is complete. The Alexander-Adams operation for shortening the round ligaments is neither the only nor the best operation for the cure of retroflexion of the uterus. Halstead's method of approach to the pituitary body by turning upwards the nose is now out of date. Cushing's approach by submucous resection of the nasal septum or Frazier's operation by frontal bone-flap are the alternatives which should be described. War experience has shown the superiority of the frontal skin-flap for restoring the nose. Syme's operation provides no epithelial lining for the nose, which consequently shrinks. The injunction to "render the foot avascular" is impossible to fulfil, though one can easily make the foot bloodless by applying a tourniquet.

The book is well printed, can easily be slipped into the pocket, and should prove useful to the student revising his work after a course of operative surgery.

X RAY DIAGNOSIS.

Die Röntgendiagnostik der Inneren Erkrankungen. By Dr. HERBERT ASSMAN, Professor of Medicine, Leipzig. Leipzig: F. C. W. Vogel. 1921. Pp. 693. M.330.

THE general trend and development of X ray diagnosis in Germany since 1914, as exemplified in Dr. Assman's book, is instructive. The most striking developments would appear to have taken place in the investigation of diseases of the thorax, especially the heart, great vessels, and mediastinum. An outstanding feature of the volume is the free use of excellent reproductions of radiographs in collotype where the finest discrimination is needed, half-tone blocks for others, lucid diagrams, and side-by-side anatomical illustrations where they would help to make the subject more clear. Almost the whole of the book is devoted to the examination of the trunk and head, disorders of the skeleton and limbs occupying less than a hundred pages at the end. Dr. Assman's book is a highly valuable work on the subject of X ray diagnosis; the volume is rather insecurely put together in a paper cover, and its contents deserve a better binding.

A MANUAL OF BACTERIOLOGY, CLINICAL AND APPLIED. Seventh edition. By R. TANNER HEWLETT, M.D., F.R.C.P., D.P.H. Lond., F.R.M.S., Professor of Bacteriology in the University of London. London: J. and A. Churchill. 1921. Pp. 808. 21*s*.

THIS work has long ranked among the best of the students' text-books on bacteriology, and the careful revision to which the seventh edition has been subjected ensures that its popularity will be maintained. Several of the chapters have been rewritten and modern work of proved importance has been adequately noticed. In the section on the standardisation of media the question of hydrogen-ion concentration is very clearly described; the chapter on the microscope has been rewritten and the methods of dark-ground illumination are dealt with; the technique of the Wassermann reaction is treated of at some length, the method of McIntosh-Fildes being the one described; and the various modern serological reactions have been incorporated in the appropriate sections. The book is carefully written, well illustrated, and reveals a sense of relative values, all going to make it one of the most readable and convenient of the text-books in this subject.

HUMAN EMBRYOLOGY AND MORPHOLOGY.

Fourth edition. By ARTHUR KEITH, M.D., F.R.S., LL.D., F.R.C.S. London: Edward Arnold. 1921. Pp. 491. 30*s*.

EIGHT years have elapsed since the last issue of this book, and we rejoice that Sir Arthur Keith has had the inclination and has found the time to bring the present edition up to date. A work by an author of such repute does not call for any criticism when it reaches its fourth edition, and we need only direct attention to certain points about this new issue. It contains 28 chapters compared with 22 in the third edition, and has been brought quite up to date, some parts being rewritten to a large extent. Full justice has been rendered to English writers and investigators, who are not handicapped by their nationality in this book. Mall's estimation of age of embryos is adopted. The account of early embryonic conditions has been extended, particularly from the comparative standpoint, and recent work of Elliot Smith and others has been incorporated in the description of central nervous development. Stress is laid on the developmental details from the evolutionary point of view, and the relation between structure and function is continually shown. The volume is larger, and some 80 new illustrations appear in it. The popularity and success of the previous editions will certainly be extended to this, which ought to be in the hands of every advanced English student of anatomy.

PSYCHO-ANALYSIS.

Addresses on Psycho-Analysis. By J. J. PUTNAM, M.D., Emeritus Professor of Neurology, Harvard University. International Psycho-Analytical Press: George Allen and Unwin, Ltd. 1921. Pp. 470. 12*s.* 6*d.*

Dr. Putnam's leading position amongst American neurologists when, at the age of 66, he accepted the theory of psycho-analysis gives value to his writings on the subject, and this posthumous collection of essays has an intrinsic value of its own. Many of them are controversial, but kindly and persuasive, and throughout there appears not merely a desire for what he regarded as scientific truth, but for the happiness and well-being of his patients; sympathy and human understanding have plainly influenced his attitude, and the reader feels that Dr. Putnam's effort to convince his colleagues arose first of all from his belief that the treatment and cure of the neurotic sufferer demand the application of the principles he so vigorously advocated. Yet there is no attempt to shirk the fight; taking into account Dr. Putnam's age and position at the time, we must, whether we think him right or wrong, admit his courage when he wrote:—

"If our spiritual life is good for anything it can afford to see the truth. No investigation is wrong if it is earnest. Knowledge knows nothing as essentially and invariably dirty. It is a piece of narrow intolerance, cruel in its outcome, to raise the cry of 'introspection' in order to prevent an unfortunate invalid, whose every moment is already spent in introspection of the worst sort, forced upon him by the bigotry, however well meant, of social conventions, from searching, even to the death, the causes of his misery, and learning to substitute the freedom, liberality, tolerance, and purity that comes from knowledge for the tyranny of ignorance and prejudice" (p. 18).

He comes out to meet his opponents in his address on "Comments on Sex Issues from the Freudian Standpoint." He speaks of the opposition as "a needless prejudice which a temperate reconsideration of the facts and arguments should remove," and bases his advocacy both upon scientific regard for truth and upon the needs of the patient.

"One must be able to look squarely and without loathing at the facts, or one must say farewell to honest judgment. But no sooner do I ask for this fairness than I am forced to grant that it is hard to give. The details of that portion of one's life which has to do directly or indirectly with the function of reproduction are usually guarded either as something too sacred or too unpleasant to be talked about. And the worst part of the business is that the persons whose interests are most at stake—namely, the neuropathic patients—must inevitably, in the present state of public opinion and public ignorance, pass through a period of severe self-humiliation if they consent to lift the veil from their own memories, or to study the psychological mysteries of their own childhood" (pp. 132–133).

Controversy apart, the author's exposition of principles is aided by long experience of older methods of treatment, and he is able to point to the personal histories obtained from patients by analytical methods as being immensely different, both in detail and completeness, from those obtained before the new treatment was begun. His frank reference to his own resistance against accepting the new theory, and his comparison of results before and after his change of view, form a record which is not likely to be repeated. Although there is no attempt to instruct in the technique of analysis, yet his clinical accounts of cases show the utility of treatment and the way in which the whole previous life of the patient may be involved in the production of the psychoneurotic symptom. Psycho-analysts might regard his analyses as superficial, but this superficiality is no disadvantage to the general reader, who may be unacquainted with the more intricate theories of recent workers: it is remarkable that Dr. Putnam has, seemingly without effort, almost entirely avoided technical phraseology.

It would be a disappointment if we found that Dr. Putnam had given us nothing in the way of criticism of psycho-analysis. In "The Necessity for Metaphysics" he pleads for an extension of the field of psycho-analysis beyond the empirical acceptation of its own findings, so that the ethical motives which indicate man's higher destiny should find consideration; in his last address he returns again to this advocacy, when he quotes Freud's view that not moral estimates but knowledge was needed for solving the problem of human life and motives, and he regards this view as a testimony both to the strength and the weakness of the psycho-analytic movement.

The absence of direct relation between the different addresses, which are in chronological order, enables the book to be read during spare moments, and it is the kind of book to which the reader returns with pleasure. Whoever reads it will, whether he accepts the psycho-analytical view or not, realise that the current methods of attack upon psycho-analysis are of no avail against Dr. Putnam's presentation. A biographical notice by Dr. Ernest Jones gives personal reminiscences of Dr. Putnam, and a lengthy bibliography indicates his contributions to psychological literature.

Concept of Repression. By GIRINDRASHEKAR BOSE, D.Sc. Cal., M.B. Cal., Lecturer in Psycho-analysis and Abnormal Psychology, and Examiner in Experimental Psychology and Physiology, Calcutta University. Calcutta: Sri Gouranga Press. 1921. Pp. 223.

Dr. Bose in his preface speaks of his difficulties in the study of psycho-analysis, and of the fact that truths he found for himself turned out to be already widely known. He has presented these truths in his own way, largely by means of analogy and diagram, and their relation to the conceptions of psycho-analysis, as ordinarily expressed, can easily be seen; for instance, his diagram on p. 49, showing the alliance of two wishes to obtain expression by symbolism, gives an example of what is generally called over-determination. His explanations are not easy to follow, and the absence of clinical illustrations has just the effect that he anticipates in his preface; one feels that his theories are mere speculative products. His chief contribution to theory is the view that the development of any particular wish is always accompanied by a development of a wish of the opposite type; this is an advance upon the theory of ambivalency, by which a complex is regarded as possessed of two opposing tendencies—for example, sadism and masochism—but the view is dogmatically stated, and supported only by unconvincing analogies, so that proper criticism of it is impossible.

We feel that Dr. Bose's ability would be more fruitfully employed in giving records of his work in a sphere where social and family conditions are so different from those where clinical psycho-analysis has hitherto been carried on. His few remarks on the male attitude to the purdah system indicate that he can throw light upon the unconscious motive of people whose mode of life is different from ours.

Psycho-Analysis, Sleep and Dreams. By ANDRÉ TRIDON. London: Kegan Paul, Trench, Trübner and Co. 1921. Pp. 161. 7*s.* 6*d.*

THE medical reader may judge Mr. Tridon's book by his handling of "sleeping sickness," a title under which he groups trypanosomiasis, hysterical narcolepsy, and encephalitis lethargica, saying of the first-named that "imitation easily spreads the contagion, and this is probably the reason why entire villages are decimated by that curious malady." His statements that memories of recent experiences accumulate in our autonomic nerves (p. 43), and that the anxiety day-dream fills the body "with glycogen and a sense of power" (p. 114) show a similar rash dogmatism. On p. 28 he assumes that all neurotic complaints are transmitted through imitation. If this be true it destroys the whole psycho-analytic theory, and Mr. Tridon's assumption warns the reader that his views on psycho-analysis are to be

approached with as much caution as his views on medicine. His thesis that we sleep in order to dream, and his effort to instruct the layman how to analyse his own dreams, must not be regarded as contributions to orthodox psycho-analytical theory or practice.

Repressed Emotions. By ISADOR H. CORIAT, M.D. London: George Allen and Unwin, Ltd. 1921. Pp. 213. 7*s.* 6*d.*

THIS is a popular exposition by the author of "What is Psycho-analysis?" and approximately represents the Freudian view, though the influence of Jung appears occasionally, as shown in Dr. Coriat's attitude regarding the value of the dream. There is some amount of carelessness both in statement and phraseology: that "in the savage there is little or no repression" (p. 79) is opposed to the views of most other workers, and is contradicted by the writer himself on pages 8 and 9. An account of a dream analysis contains the sentence "the analysis released the repressed omnipotence [and] symbolised it like a fairy tale," but even for one familiar with the technical usage of these words it is difficult to guess their meaning. The description (p. 176) of a case of kleptomania reads like an example of simple theft stopped by the old-fashioned method of implanting fear of punishment.

There is plenty of good material in the book, but the exposition of a subject still controversial needs to be handled with more clearness of thought and expression than is shown here.

THE WASSERMANN TEST.

Second edition. By CHARLES F. CRAIG, M.D., M.A., F.A.C.S., Lieut.-Colonel, Medical Corps, United States Army; Director of Laboratories, Army Medical School, Washington. London: Henry Kimpton. 1921. Pp. 278. 25*s.*

THIS volume gives a clear account of the author's method of performing the Wassermann test, incidentally one of the methods authorised for use in the hospitals controlled by the United States Public Health Service. In carrying out the test the hæmolytic power of the complement is standardised as a preliminary. The hæmolytic system consists of human red corpuscles and an anti-human amboceptor prepared from rabbits. In the actual test 2 units of amboceptor and 2 units of complement are used. This necessarily means cutting down the antigen to a relatively small amount, and is contrary to the idea generally favoured in this country, where the most accurate results have been obtained by using a hæmolytic system saturated with amboceptor. This allows of the use of a larger amount of antigen and gives a sharp end-result. The remainder of the volume is mainly concerned with the author's experience of the test and the influence of treatment.

As a monograph on the Wassermann reaction the book is disappointing, and by no means fulfills Colonel Craig's promise to incorporate everything of real value relating to the subject. This is particularly marked as regards British literature; for instance, no mention is made of the important publications of the Medical Research Council on the Reliability of the Wassermann Reaction.

THE SPLEEN AND SOME OF ITS DISEASES.

By Sir BERKELEY MOYNIHAN. Bristol: John Wright and Sons. 1921. Pp. 129. 21*s.*

Sir Berkeley Moynihan has done well to publish in permanent form his Bradshaw lecture on the spleen. The lecture at the time of its delivery was recognised as a lucid and learned disquisition on a subject which has given rise to much speculation as well as experimental work. In addition to his skill as an operator Sir Berkeley Moynihan possesses two faculties not always found in general surgeons—a critical faculty which can range over and adjudicate upon a vast amount of material, and an attractive manner of presenting his conclusions. A short chapter on the technique of splenectomy would have been a valuable inclusion; the technique is described in Sir Berkeley Moynihan's book on abdominal operations, but there are several points upon which his views may have changed with increased experience.

The monograph is an admirable summary of modern ideas on a subject of increasing importance, and will find a place on the bookshelf of medical men interested in diseases of the spleen from the medical and pathological as well as the surgical standpoint.

LECTURES ON SURGERY TO NURSES.

By ALAN H. TODD, B.Sc., M.S. Lond., F.R.C.S. Eng., Lecturer and Surgeon to Nursing Staff, Guy's Hospital. London: Edward Arnold. 1920. Pp. 270. 7*s.* 6*d.*

THIS book should be of ingstimable value to all nurses anxious for an intelligent understanding of the principles underlying surgical nursing. The author's aim throughout has obviously been to prepare the nurse to become an "intelligent coöperator in everything that is done," realising that much of the surgeon's work can be frustrated in his absence unless those in hourly charge have grasped the fundamental principles of surgery. This is specially true with regard to fractures and dislocations and diseases of the joints and spine, and two excellent chapters on these branches of surgery should do much to increase the interest and understanding of the nurse in her care of these cases. The chief merit of this book lies in the fact that it has been written by a surgeon but from the nursing point of view, and it can be recommended to all nurses in training.

JOURNALS.

IN the *Journal of the Royal Army Medical Corps* for August there is commenced a series of articles on "Malaria in Macedonia," written by the officers of the Malaria Inquiry Laboratory, established at Salonica by the Director of Medical Services, Major-General Sir Maurice Holt. The series opens with a paper on "The Incidence and Ætiology of Malaria in Macedonia," by late Temporary Colonel C. M. Wenyon, who tells us that some 150,000 cases of malaria were reported there in the three years, 1916, 1917, 1918. The epidemic dates from June, 1916, when the force advanced to occupy the low-lying valley of the Struma, to the east of Salonica. All the hill country of Macedonia was malarious, the predominant mosquitoes being, in the low ground *A. maculipennis*, on the high grounds *A. superpictus*. Anti-malarial—i.e., anti-larval—measures could not be taken before the advance which was made into a district swarming with mosquitoes, and in which the malaria-infected inhabitants were nearly all carriers. In 1916 hope was based on quinine prevention, but there were 30,000 cases. The worst cases were sent home, but large numbers of carriers remained in the army. In 1917 much anti-larval work was done; still the unrestricted submarine campaign prevented the removal of the sick, and, partly because of their numerous relapses, 70,000 cases were reported, of which 16,000 in September. In 1918 the year started unfavourably with far more infected and carriers, but the total was 50,000 cases, and numbers decreased after June, because, Colonel Wenyon thinks, 25,000 were sent home through Taranto. This year, too, there was far more individual protection from mosquitoes for the soldier—nets for beds, head nets and gloves, also mosquito-proof wards for the treatment of the infectious sick. Nets must be properly used; Colonel Wenyon saw a patient who had crescents in his blood, and a patch of his bare skin touching his net was simply covered with anopheles. In an extensive, highly malarious area such as this, transiently occupied, protection of the individual men probably does most good. Anti-larval measures cannot go far enough afield to protect against mosquitoes which can travel two miles at

east. The French suffered about equally, and the Bulgarians had at one time 23,000 malaria cases in hospital.—Dr. W. Wallace completes his long and valuable discussion of "The Vision of the Soldier." He would like to see peep-sights fitted to the rifle for use at short ranges to allow ametropes to shoot at these ranges without spectacles; peep-sights are fitted for the long ranges. He wonders why head-masters at public schools do not have their boys' teeth and eyesight examined carefully, that defects may be put in order before military service is due or professional work begins. One of the great problems of a national army is the use that can be made of a man with defective vision. He must not be thrown aside. Where can he best be placed?—Captain T. O. Thompson relates the history of an officer who during the war began to suffer from pain about the kidneys, and became cachectic, so remaining for some years, in the course of which he was treated unsuccessfully with an autogenous vaccine of, it was stated, *B. coli* from his urine. When he again came under treatment in India another autogenous vaccine was prepared from his urine plated on Conradi plates. A pure culture of *Bacillus coscorobæ* was found, and he got 3,100,000 as a first dose. This set up a violent reaction lasting four days: temperature up to 105° F., intense pain and tenderness about the kidneys, and extreme bladder irritability; but patient thereafter felt much better. In about a fortnight he got a second injection, 400,000 only this time; a very slight reaction followed. Thereafter dosage was increased by a half each time. He became robust, put on fat, and considered himself cured. No mention of another case of coscoroba bacilluria could be found in the literature.

Parasitology. Edited by G. H. F. NUTTALL, F.R.S. Vol. XIII., No. 3. June, 1921. C. F. Clay: Cambridge University Press. 15*s.* net; yearly subscription £2 5*s.*—This number opens with an article on the Life-history of *Helicosporidium parasiticum*, n.g., n.sp., a new type of protist parasitic in the larva of *Dasyhelea obscura* Winn. (Diptera, Ceratopogonidæ) and in some other Arthropods, by D. Keilin. It deals with a protist which differs markedly from all known protozoa and which is highly pathogenic to the larvæ of at least two species of Diptera (one being a fairly common midge) and to a mite. The hosts inhabit wounds in elm and horse-chestnut trees. The striking character of this new parasite is the spore containing three sporozoites and a spiral filament. In the dead body of the host the spores open and the spiral filament unrolls, liberating thus the sporozoites.—The article on the External Anatomy of the *Sarcoptes* of the Horse, by P. A. Buxton, contains an exhaustive morphological description of all the stages of *Sarcoptes scabiei*, var. *equi*, which is very similar to the human *Sarcoptes*.—In the paper on *Sarcoptes* of Man, P. A. Buxton compares *Sarcoptes scabiei* var. *equi* of the horse and *Sarcoptes scabiei* var. *hominis* of man, and concludes that it is at present impossible to separate these two species. In the same article he deals also with *Sarcoptes scabiei crustosæ*, which is the cause of a rare disease known as Norwegian itch, or crusted scabies.—In the Notes on *Rickettsia*, E. Hindle confirms the main observations of Arkwright and Bacot, who showed the association of *Rickettsia* with trench-fever. This micro-organism is only 0·3μ in diameter, it multiplies in the gut of the louse, and the infection of man takes place when the excreta of infected lice touch any abrasion in the skin of a healthy person. The paper contains a description of *Rickettsia* from other blood-sucking and not blood-sucking insects.—The article on the Anatomy and Biology of the parasitic *Aphelenchi*, by F. H. Stewart, deals with three species of nematodes parasitic in plants. In addition to the morphology, the paper contains an account of the life-history of these parasites, indications on the treatment of diseased plants and of prophylactic measures against spread of the disease.—A Supplementary Account of the Dipterous Larvæ feeding upon Molluscs, by D. Keilin, completes a previous [illegible] (*Parasitology*, Vol. XI.) of parasitic, carnivorous, and saprophytic dipterous larvæ feeding upon molluscs.—The number is concluded with an article on the Nephrocytes of *Pediculus Humanus*, by G. H. F. Nuttall and D. Keilin, which deals with special cell aggregates disseminated in the body cavity of the louse, the function of which was unknown. The excretory function of these cells was demonstrated by a special method of injection of ammonia carmine into the body cavity of lice.—The number contains three portraits obtainable separately of: *Francesco Redi* (1626–1697), *Carolus Linnæus* (1707–1778), and *Carl De Geer* (1720–1778).

New Inventions.

A NEW TRACHEOTOMY TUBE AND FALSE MEMBRANE FORCEPS.

I HAVE designed the tracheotomy tube here illustrated (Fig. 1) with the objects of facilitating

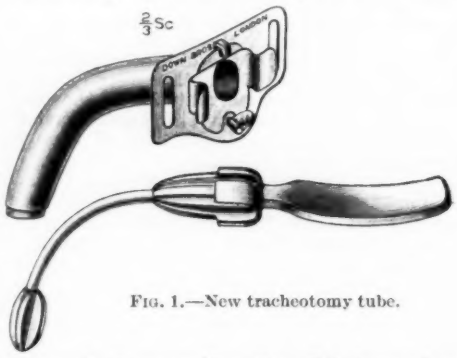


FIG. 1.—New tracheotomy tube.

cleaning and of preventing the pilot from stopping the child's breathing. Retention of the tube is also facilitated in the case of patients with fat necks.

Compared with the old form of Parker's tube, in the improved instrument the shield is made of stronger gauge silver and quite smooth except for the hook which retains the outer tube, and it has holes only for the outer tube and tapes. The outer tube has a small notch at one side near the front; the tube can be turned round, and as the hook passes through the notch the tube can be removed and properly cleaned. The catch in front of the outer tube, which turns and retains the inner tube, has always been a weak point in the Parker's tube; it was liable to become loose and sometimes came out. The catch is now strengthened. The inner tube is slightly longer to fit the outer tube and has no raised wire loops; these were only necessary on the Parker's tube in order to take the tube out; on my new tube the edges of flange on either side are extended and turn up, and are much easier to clean than the loops. The new pilot has the section of an X, and so leaves four spaces round it, allowing the child to breathe quite easily whilst it is being introduced.

The trachea forceps, which was designed by my late superintendent, Dr. J. McCombie, for withdrawing membrane or inspissated mucus, has been found too thick for going down the trachea of a small child. I have had the instrument made much thinner, as is shown in Fig. 2, and the joint brought nearer the

FIG. 2.—Trachea forceps.

handles. This prevents the blades from locking when in the trachea.

Messrs. Down Bros., St. Thomas's-street, S.E., are the manufacturers of the instruments.

A. CUBLEY, M.R.C.S., L.R.C.P. Lond.
North-Eastern Hospital, Tottenham.

THE LANCET.

LONDON: SATURDAY, SEPTEMBER 10, 1921.

The British Association at Edinburgh.

THE British Association met again this week in the city where it had its origin; for the virtual founder of the Association was Sir DAVID BREWSTER (1781–1868), preacher, natural philosopher, and optical discoverer, whose great aim it was to make a permanent organisation with settled establishment, which should not merely come together year by year in a great social reunion, but should give a continuous impulse to every part of the scientific system. The Association met at Edinburgh in 1834 and again in 1850, 1871, and 1892, and Sir EDWARD THORPE in his presidential address on Wednesday evening last indicated some of the aims of his predecessors in the chair and their measure of fulfilment. BREWSTER'S wish to see established in Britain a national institution of resident members devoting themselves wholly to science is still unrealised, although since his time many scientific workers have obtained the place and station in society which he desired for them—respectable and independent—free from the embarrassments of poverty or the temptations of wealth; and the President recalled the claim made for BREWSTER on his death that the improved position of men of science was chiefly due to his exertions and his example. Lord KELVIN, presiding at Edinburgh in 1871, gave expression to the need for experimental research to become an object of national concern, and now in the establishment of the National Physical Laboratory some approach to this ideal may be seen. Industry, too, is beginning to realise that invention depends upon discovery, discovery on research, and research in its turn on training in science, with the result that a Department of Scientific and Industrial Research has come into being, which, while aiding the individual worker, leaves him free to pursue his inquiry as he himself thinks best.

Turning from the general to the special, Sir EDWARD THORPE opened up a question with which all of us are inevitably concerned, whether actively or passively. What is the inner mechanism of the atom? Until this question is answered, much of bio-chemistry must remain on an insecure basis. Although nearly a century since DALTON formulated the atomic theory, it is only within the last few years that our conception of the structure of the atom has become sufficiently precise to be of any service to the chemist. The discovery of the electron, the production of helium in the radio-active disintegration of atoms, the recognition of the existence of isotopes, all these are quite recent discoveries, and with them chemical philosophy has definitely entered on a new phase. One of the most puzzling discrepancies in exact chemistry—namely, the persistently fractional value of the oxygen standard of some atomic weights, while the majority were whole numbers—has recently been cleared up by the ingenuity of Mr. F. W. ASTON, who has shown a number of elements to be in reality mixtures of isotopes. Chlorine has repeatedly given a value of 35·46 and only by an extension of Sir J. J. THOMSON'S method of analysis of positive rays has this gas been compelled to admit that it consists of two isotopes of relative mass 35 and 37. Neon, argon, bromine, boron, silicon are equally complex, while fluorine, iodine, sulphur, phosphorus, and arsenic are apparently simple elements. This discovery has greatly cleared the way to the formulation of an actual physical basis for MENDELÉEFF'S astounding periodic law. Sir EDWARD THORPE made this basis crystal-clear in his address. Electrons appear to be arranged in the atom on the plan that the positive charge is at the centre with the negative electrons around it on the surface of a sphere. Take, he said, the case of the atom of lithium, which is presumed to have one electron in the outer layer. As each element has one more free electron in its atom than its predecessor, glucinum, the element next in succession to lithium will have two electrons in the outer layer of its atom, boron will have three, carbon four, nitrogen five, oxygen six, fluorine seven, and neon eight. As there cannot be more than eight electrons in the outer layer—when more than this the layer of electrons explodes and a new arrangement is formed—the additional electron in the atom of the next element, sodium, cannot find room in the same layer as the other electrons but will go outside, and thus the atom of sodium, like that of lithium, will have one electron in its outer layer. On this disposition depends the atomic number and the valency. Happy are the students to whom the facts of physico-chemistry can now be presented in such reasonable and attractive guise.

To the Section of Physiology Sir WALTER FLETCHER, secretary of the Medical Research Council, gave a short presidential address which those interested in the next stage of medical education will find suggestive (see p. 541). For the story of the rise of physiology, of its early connexions with anatomy, its subordination to specialism, and its later developments into a broad and general science, is a great example of the way in which the work of separate schools and separate individuals can, under an organised university system, become a homogeneous and forceful whole. And in this development and consolidation of the very foundations of modern medicine, the science of our own country has played a leading part, as could be insisted upon appositely in an address to the British Association. Sir WALTER FLETCHER referred to the synthetic tendency of modern physiology because of its practical bearing upon the present development of the subject in the universities and medical schools. There is no doubt that the whole conception of physiology to-day by teachers and by taught is larger and fuller. We all see that a knowledge of the general processes of life and of their interplay is necessary for the comprehension of the pathological problems, large or small, which present themselves, as serious or rare events in hospital wards and casualty rooms, and on everyday occurrences in routine practice. Through physiology and through physiology alone can be learned the guiding principles of treatment, while it is also to physiology that we now look for assistance in the development of preventive medicine made possible by early diagnosis.

The Pathology of War Nephritis.

DEATH in the first fortnight of acute glomerulo-tubular nephritis is not common, and, as seen in civil practice, acute nephritis is often a complication of some other disease such as scarlet fever or tonsillitis. There has not, therefore, been abundant material for the study of the early histological changes in acute nephritis. The war has made good this deficiency through the epidemic of war nephritis that was observed in the armies in the field; and this disease, which is in all respects a true glomerulo-tubular nephritis, has been particularly convenient for study, since it is at the same time a primary nephritis and a single clinical entity; the cases also were so numerous that it could be studied in the several stages of its course. An article by Prof. K. HERXHEIMER recently published in Germany makes an important contribution[1] to the knowledge of what is there called Feld-nephritis. It is based on his own observations as well as on those of other German pathologists, and due reference is made to work done in this country. The author finds that when death occurs within eight days of the onset of the disease practically no changes that can be recognised by present methods of fixation and staining are visible in the kidneys. The earliest pathological change is found in the endothelial cells of the glomerular tufts, which swell and show slight fatty degeneration; their lumina become empty of red blood corpuscles and filled with a coagulum. Later there is a proliferation of endothelial cells, infiltration with small cells, and, to a slight extent, proliferation of the epithelial cells that form the visceral layer of Bowman's capsule. It would appear that in its earliest manifestation the lesion is limited to occasional loops of glomeruli; soon the lesion involves the whole or greater part of the tuft and affects the great majority of the glomeruli. Towards the end of the third week the epithelial cells of Bowman's capsule proliferate and the characteristic crescent-shaped masses of cells in the intercapsular space are seen; at the same time adhesion may occur between some part of the visceral and parietal layers of the capsule, and exudation of coagulum and migration of cells into the intercapsular space takes place. In this, the subacute stage, granular, hyaline, and fatty changes are observed in the epithelium of the tubules; the cells swell and desquamate, some of the cells lose their nuclei, and there is an increase in the size of the lumen. In the third, or subchronic, stage the fibrous connective tissue of the stroma increases, and fibrosis of individual glomeruli takes place. Prof. HERXHEIMER finds that the primary lesion is limited to the capillary loops of the tufts, and he regards the parenchymatous lesions as secondary to the vascular lesions. Having formed this opinion he looked for evidence of capillary damage outside the tufts, but the presence of minute extravasations of blood from the inter-tubular capillaries and small accumulations of cells in their neighbourhood provided unconvincing evidence of such damage.

The microscopical appearances in the glomeruli in war nephritis were described by SHAW DUNN and MCNEE[2] in 1917, and though not worked out in the same detail for the different stages of the disease their work covers the ground traversed by HERXHEIMER; in addition, they made a more careful study of the changes in the body outside the kidney. They demonstrated important microscopical lesions in the bronchioles and infundibula of the lungs, which they compared with the lesions of phosgene poisoning. Their observations are of special interest, because they were able to demonstrate capillary changes in the neighbourhood of the pulmonary lesions, as well as in the brain and spleen. They suggested the possibility of miliary embolism as an explanation of the focal capillary damage observed. These observations were confirmed in their main features by TYTLER and RYLE[3] in 1918; these authors regarded the lesions in the lungs and spleen as the most characteristic lesions of the disease in its acute and early stages. They remark that the tissue changes seen in the glomeruli suggest a local inflammatory process affecting the vascular endothelium, and that while the kidney lesions are constant and characteristic they are not specific. These contributions to the study of the histology of war nephritis are in close agreement in observations of fact, and are authoritative pronouncements on the subject. It is established that war nephritis is a true glomerulo-tubular nephritis. Though none of the authors quoted press the view that acute nephritis is primarily an affection of capillary fields, their work lends some support to this theory. In fact, to quote the paradoxical phrase of Dr. P. AMEUILLE—"Néphrites aigues sans néphrite"—it seems conceivable that "acute nephritis" may occur without "nephritis."

[1] Handbuch der ärztlichen Erfahrungen im Weltkriege. Vol. viii., Pathologische Anatomie. Edited by Ludwig Aschoff. 1921.
[2] J. Shaw Dunn and J. W. McNee: Brit. Med. Jour., 1917, ii., 745.
[3] W. H. Tytler and J. A. Ryle: Q. J. Med., 1918, xi., 112.

An Apology for Spas.

WE print in another part of this issue a series of articles on continental spas and health resorts, based upon a visit to Savoy and Switzerland by two representative parties of British medical men, the arrangements for the visit having been made by Sir HENRY LUNN with the managers of the resorts and railways concerned. From the glamour of the Alps and the generous hospitality of Swiss and Savoyard it is desirable to disentangle a critical estimate of spas and spa treatment. Although spa treatment is very ancient, most of the baths indeed being already in use in Roman times, the science of balneology is still young, and it has been said with some justice that equipment and technique have advanced far beyond the scientific basis upon which the treatment is based. While this may well be true, the statement would apply equally to modern surgical technique in which the knife, the incision, and the sutures are all marvellously complete and perfect, although the value of the operation may be in dispute. That health resorts heal and baths relieve is quite indubitable, even in the absence of any sufficient scientific explanation, and no one has put this better than a certain Dr. JOSENHAUS in a jeu d'esprit[4] on the discovery of radium in the Wildbad waters, the last stanza of which may be thus rendered roughly in English:—

> At last the learned world has come
> To think the Wildbad cure is real.
> Is this because its waters heal?
> No; they contain some radium.

At some of the spas, at all events, the medical staff is keenly alive to this implication of mere symptomatic treatment. Dr. L. DUVERNAY, of Aix-les-Bains, has recently set out in an able thesis the reasons for thinking that there is a habit of body, aptly expressed by the term arthritism, radically modified by the Aix cure, which therefore does far more than relieve the

[4] Quoted in "The Principles and Practice of Medical Hydrology." By R. Fortescue Fox, M.D. University of London Press. 1913.

painful manifestations of rheumatoid disease. A course of spa treatment may modify the terrain to such an extent that the body recovers its equilibrium. And to the patient this equilibrium is the essence of health. It has been contended, again with some show of justice, that the unsuccessful results of spa treatment are not reported. In a country village the doctor's failures go about the only street on crutches; the failures of spa treatment, like those of fashionable quacks, are scattered far and wide, and have no means of speaking with a common voice. Still, in the long run, it must be on actual concrete results that success depends, as may be seen from the fact that within the larger resorts there are always smaller units which enjoy continuous patronage while success waxes or wanes around them, and this success must depend on a good report handed on from patient to patient by word of mouth. A frescoed notice in an Upper Engadine bath runs: "The scientific individual adaptation of the prescription increases the efficiency of the cure uncommonly," and several Engadine resorts have scientific workers of university standard among the practising doctors. At St. Moritz Bad Dr. S. HEDIGER is working out the effect of baths upon the volume of the pulse, using the sphygmovolumeter designed under Prof. O. VERAGUTH at the Zurich Institute for Physical Therapy. At Tarasp Dr. E. LENZ, who lectures on pharmacology at Berne, has shown by exact observation that a week in a subalpine climate may act precisely like a digitalis cure.

Health resorts have been known to cry up their own wares and decry those of others, but there need, we think, be no jealousy as between spa and spa. There is a mass of relievable chronic ill-health which does not necessarily show on any monthly mortality return, and which yet reduces in large measure the efficiency and happiness of the community. Much of this can be mitigated or relieved by spa treatment, and there must be resorts for many different tastes. Some undoubtedly possess such wealth of natural advantage that it is hardly human to expect an equally high standard of art; others less favoured by Nature have built up a substantial and sufficient reputation by performing well all the adjuvants of treatment. It may be recalled that the mere climate of the Black Forest, in which the late OTTO WALTHER made the name of Nordrach world-famous, has little enough to recommend it. As between home and abroad, a little competition is good for both spa and patient, and it is open to our own resorts to cater for the outlander just as they do for us. The captain of the Syrian host in lauding the virtues of his own home waters over the Jordan apparently was not speaking from actual personal experience of them. We can hardly bring to the Welsh or Yorkshire uplands the blue sky and pellucid air of the south, yet the Aix massage, the Plombières douche, or the Nauheim bubbly-bath may be equally effective wherever they are individually and skilfully applied.

A NEW HOSPITAL AT COLNE.—On Sept. 3rd Sir William P. Hartley, of Southport, laid the foundation-stone of the new hospital which he and Lady Hartley have presented to their native town of Colne. Some years ago Sir William Hartley gave to the town a cottage hospital and the Hartley Homes, in which aged natives of the town live rent-free. The new hospital is arranged for 50 patients and stands in grounds covering over four acres. Sir William Hartley said the financial position of the hospital was assured by the adoption of a scheme of weekly contributions by the workpeople, in addition to annual subscriptions. Mr. Wilson Hey, F.R.C.S., of Manchester, also a native of Colne, opened the subscription list with a gift of 100 guineas.

Annotations.

"Ne quid nimis."

LIGHTING IN KINEMA STUDIOS.

THE effect of ultra-violet radiation on the eyes has interested ophthalmologists for many years; it was discussed at the International Congress of Medicine in 1913 and papers on the subject have appeared at intervals since. Now the matter has again come into prominence owing to the results of the use of powerful arc lamps of American make in British kinematograph studios during last year. Some of the actors and actresses developed a form of conjunctivitis after working in this intense light, and the matter was referred by the Minister of Health to the Committee on the Causes and Prevention of Blindness. This committee has now issued an interim report.

Each division of the spectrum is associated with certain characteristic effects—radiant heat with the infra-red, light with the visible part, and chemical effects with the ultra-violet—but the visible part has thermal and chemical properties too, as well as that of light. Radiant heat induces erythema of the skin, which reacts and thereby protects itself by sweating. The moist eyeball is similarly protected and the fluid media of the eye act as an absorbent screen. Heat rays seldom reach the retina although they are refracted in the eye exactly as are light rays. They do reach the lens when the eye is subjected to prolonged exposure; cataract in glass-blowers is sufficient confirmation of this. Visible rays in excess induce another protective measure—blepharospasm, which is a characteristic feature of the typical albinotic facies. The kinema actress, however, must usually voluntarily dispense with this protection; so many emotions are associated with sympathetic nerve stimulation and induce a wide palpebral aperture. The most familiar protective result is a contracted pupil and the ocular pain complained of probably results from stimulation of sensory nerve-endings in the iris.

Dazzling is an interesting, if distressing, phenomenon. Its usual cause is a corneal or lenticular opacity which scatters instead of refracting the rays of light. But the normal cornea is not quite transparent and some diffusion occurs in the eye with ordinary illumination. Under conditions of excessive illumination this increased diffusion will cause dazzling. Excessive light also may enter the eye through less transparent structures such as the iris. Indeed, the position of the normal man in relation to intense light is that of the albino in relation to ordinary light. Erythropsia is associated with a large pupil and with aphakia. It is due to the visible rays, but the ultra-violet rays, if not essential to its production, materially assist. It is a common accompaniment of snow-dazzling, and light reflected from snow is rich in ultra-violet rays. The lens absorbs ultra-violet rays and it also converts them into waves of greater wave-length, producing the phenomenon of fluorescence of the lens. A large pupil is a sign of sympathetic stimulation and in the business of acting must be an almost habitual occurrence. Erythropsia should be a familiar after-effect of kinema acting in intense light; it might almost be taken as an index of the emotionalism of individual actors and actresses.

The symptoms attributed to the intense lights used for the production of films are exactly those of snow-blindness and electric ophthalmia, and, like erythema of the skin after exposure to unusual amounts of sunlight, are due to the actinic or ultra-violet rays. After a latent period of half or one day follow redness of the lids, injection and chemosis of the conjunctiva, photophobia, and pain. Erosions of the cornea have been described after exposure to light from the arc used in electric welding and stress is usually laid on contraction of the pupils. This is not due, however, to the stimulus of light, for congestion miosis is common in all corneal and conjunctival inflammations. The symptoms pass off in a few days. The latent period

is of interest. In the effects of X rays and of radium it is longer still—maybe some weeks.

The committee has established that these powerful searchlights are not less efficient when used with diffusion screens, and it is gratifying to learn that the Association of Kinematograph Manufacturers on its own initiative has given an undertaking to the Minister of Health that its members will not permit the use of open arc lights without filters in their studios. The Committee has accepted this undertaking, but wisely points out that research is needed as to the best type of lamp required.

A CONTROVERSY ON INDUSTRIAL ACCIDENTS.

THE publication in the United States of a *Public Health Bulletin*[1] dealing with the comparison of an eight-hour plant and a ten-hour plant has aroused considerable interest on account of the conclusions drawn from a mass of data carefully collected. Further, the authors have unexpectedly stepped out of their way to attack the conclusions come to in an investigation, made on behalf of the Health of Munition Workers' Committee in this country by Dr. H. M. Vernon,[2] into the causation of industrial accidents. The conclusions arrived at by Dr. Vernon were, briefly, that industrial accidents depend primarily upon industrial risk; in other words, varying speed of production is the factor largely responsible for variations in accident rates. Nevertheless, if the work is so unduly heavy, or so prolonged as to produce over-fatigue, the accident rate rises out of proportion to production, but still the variations in accident rate from hour to hour are in the main governed by variations in output. The American authors considered they had found evidence to justify them in placing greater stress upon the influence of fatigue and less upon risk. Hence the attack. But those who live in glass houses should not throw stones; and immediately the *Bulletin* reached this country, errors were pointed out in these columns vitiating the possibility of relying upon the deductions drawn by these authors, or of accepting the attack on Dr. Vernon as otherwise than unjustified. We pointed out that curves representing the hourly output of all classes of workers were compared with curves representing the hourly occurrence of accidents among the same workers; while data given elsewhere in the *Bulletin* showed that approximately 50 per cent. of the accidents occurred among 34 per cent. of the workers with less than six months' service; "the level of the accident rate varied inversely with the experience of the workers." In other words, output which was mainly contributed to by the 66 per cent. of workers with a service longer than six months—the level of output rate varies directly with the experience of workers—is compared with accidents which are equally contributed to by this 66 per cent. and the 34 per cent. with less than six months' service whose output, being less in absolute amount per man, cannot have materially influenced the general output curve; yet the hourly variations of output among the two groups cannot be expected to have tallied, indeed there is every probability of disagreement.

No attempt to explain this fallacy has been made, and, possibly for this reason, Dr. Vernon has wisely refrained from embarking upon a considered reply. The cudgels have, however, now been taken up in America, and a controversy has appeared in the April number of the *Journal of Industrial Hygiene*[3]; this controversy may have been occupying the full attention of the authors of the *Bulletin*. Here Dr. A. H. Ryan deals at considerable length with the statistical methods employed by the authors. His criticism is keen, but just. He clearly shows that fallacies have crept into the output and accident indices, substantial enough to invalidate the deductions drawn. He holds that "in view of the objections to the output and accident indices, neither can be accepted as valid, either for the plant as a whole, or for a sufficient part of either plant to be truly representative"; and, further, declares the evidence on lost time not to be conclusive, and the comparison between the two plants to be fallacious. Dr. Ryan disclaims being associated with the bulk of the *Bulletin*, and appears to regret that some of his own work, dealing with rhythm in industry, is included in this publication. Mr. P. S. Florence, one of the authors of the *Bulletin*, to whom this stringent criticism was submitted, essays a reply. But it begs the question and is consequently ineffective. He is driven to accept the criticism as well founded, and has to fall back upon being "doubtful whether the refinements which Dr. Ryan suggests would have made any material difference in the conclusions to be drawn." The authors of this *Bulletin*, which has received much notice, would have done well to submit it to much more careful examination before publication. The *Journal of Industrial Hygiene* has done good service in publishing this discussion.

[1] Comparison of an Eight-hour Plant and a Ten-hour Plant. Public Health Bulletin, No. 106. 1920. Washington.
[2] An Investigation of the Factors Concerned in the Causation of Industrial Accidents. H. M. Vernon. Health of Munition Workers' Committee. Memo. 21. 1918. Cd. 9046.
[3] Discussion of Public Health Bulletin, No. 106. By Dr. A. H. Ryan. And Reply by Mr. P. S. Florence. Journal of Industrial Hygiene. April, 1921.

IN DEFENCE OF THE BACILLUS BULGARICUS.

ALTHOUGH Metchnikoff's teaching as to the value of the lactic acid ferment in the large intestine has still many devoted apostles among laymen—especially on the continent—the results obtained and published by medical men who have used preparations of *B. bulgaricus* in their practice have brought little credit on this method of treating intestinal putrefaction. Prof. E. Doumer, of Lille, while he accepted the practical failure of this treatment, was not able to forget that Metchnikoff had to his credit some convincing experiments carried out in vitro. Why, then, did the same experiments inside the human intestine end so differently? His answer,[1] formulated after careful research, is that the bacillus is provided with a nourishing diet in the test tube, while in the intestine he finds himself deprived of all food in the midst of his enemies. Metchnikoff, it seems, had made the mistake of assuming that some starch would survive the action of both ptyalin and diastase, whereas in fact no starch does. Prof. Doumer therefore coats a proportion of starch with paraffin melting at 44°–45° C. Analysis shows that such a mixture provides available starch in the large intestine and the recorded clinical experience tends to indicate that the bacillus is not slow to take advantage of it.

OUTLOOK FOR PHYSICAL RESEARCH.

IMPETUS is being given to physical research in California by an annual grant of £30,000 made by the Institute of Technology for the current expenses of a new laboratory, the equipment of which is being provided by a private donor, at a cost of no less than £60,000. That manufacturers are keenly alive to the benefit accruing to them from physical researches is shown by the participation of the Southern California Edison Company in some of the new activities, for they are bearing the cost of apparatus required for investigations in the transmission of electrical power at high voltages.

Prof. R. A. Millikan has been appointed director of the new institute. A novel feature of the personnel is that Prof. Lorentz of Leiden is to be one of the staff for the winter months, and it is expected that some British experts will be invited to similar temporary appointments. This seems to be an extension of the idea of travelling professorships, and if a galaxy of talent is thus to be made available to the institute far-reaching results may be anticipated. Physical research has an ever-widening range of action and of

[1] Le Scalpel, August 13th, 1921.

application. The whole problem of available power for the service of man is a question of the possible mode of transformation of the various forms of energy. Physical research has shown the laws which govern these transformations, but the new knowledge arising out of radio-active and associated problems has pointed to the indisputable fact that within the atoms a vast source of energy exists. The question that confronts the physicist to-day is whether this source of energy may be made available. Only a comparatively minute fraction of the atoms liberate any of their energy spontaneously, these being the radio-active ones. The probability of releasing energy on a large scale from the atoms which are the bricks of the structure we call the world, is difficult to estimate, but atomic studies are a necessary precursor to it. Medical interest in physical research has received a great stimulus as electricity and the many forms of radiation become more and more wielded in its service.

It is impossible to read of the many benefactions to research in all its forms in America without some regrets that these are such seldom events in this country. Here the academic world is not, at the present time, getting the number of men it should to devote themselves to pure research. Should this state of affairs continue it will be a bad day for physical research, and the British school of physicists will hardly maintain its proud record. The need is not so much for institutes, since excellent laboratories exist throughout the country; what is wanted is facilities whereby men can carry out researches after qualification and before taking up senior appointments which carry a livelihood with them.

OCULAR REACTIONS IN ANAPHYLAXIS.

RECENT experiments have shown to what an extraordinary extent the excitability of the smooth muscle of the uterus, intestine, blood-vessels, and lungs can be increased in guinea-pigs sensitised by anaphylaxis. R. Kodama[1] investigated the smooth muscle of the eyeball and its surroundings in guinea-pigs sensitised by the injection of 0·01 c.cm. and in other experiments by injecting 2·5 c.cm. of horse serum under the skin. The anaphylactic sensibility was after a few weeks produced by dropping the same serum into the conjunctiva, or by intra-orbital, intravenous, or subcutaneous injection, control experiments being made on non-sensitised guinea-pigs. The palpebral fissure and pupil were accurately measured. In both normal and sensitised animals the application of horse serum to the conjunctiva caused at once a dilatation of the palpebral fissure and pupil, followed by narrowing of both. In sensitised animals the reaction was both quicker and more marked. The primary dilatation was due to the stimulation of the smooth elevator fibres of the eyelids and the dilator of the iris. The secondary narrowing of the palpebral fissure and iris is due to two factors—decrease of the tonus of the tarsal muscle and dilator iridis, and contraction of the sphincter iridis and congestion of blood. The primary stimulation of the smooth muscle of the eyelids and dilator iridis requires only a very small dose of the anaphylactic poison, whilst the sphincter pupillæ is acted on later and is brought into action with more difficulty. These reactions of the smooth muscles of the guinea-pig seem to show that the terminations of the sympathetic nerve as well as those of the oculo-motorius are affected by the anaphylactic state. Injection of horse serum into the orbital cavity, as well as intravenous injection, both in normal and sensitised animals, caused increased secretion of the lacrymal and Harderian glands as well as vaso-motor disturbances, and sometimes hæmorrhage from the epibulbar and retinal vessels. In anaphylactic death there was a sudden contraction of the pupil. All the reactions occurred equally, whether normal horse serum was used or serum that had been heated for some time at 56° C.

[1] Jour. of Infectious Diseases, vol. xxviii., 1921.

THE INFLUENCE OF ARSENICAL PREPARATIONS ON CUTANEOUS TESTS.

ARSENIC has a selective action upon the skin in a number of ways not yet clearly understood. Dr. Albert Strickler,[1] professor of dermatology and syphilology at the Temple University, Philadelphia, has carried out a series of investigations to determine the influence of various arsenical preparations on the luetin, Pirquet, and anaphylactic food tests. The influence of a repetition of the luetin test was first examined without any arsenical preparation being used. Two Wassermann tests were made on each patient, both of which had to be negative before the cases were regarded as eligible. In the repetition of the luetin test positive reactions were obtained in three out of 14 cases. Dr. Strickler suggests that the positive reaction was due to sensitisation of the skin produced by the first inoculation of dead spirochætes. The influence of intravenous injection of arsphenamin on the luetin test was then examined in 17 patients suffering from various skin affections, two negative Wassermann tests as in the first series having first been obtained. The patients were given from two to five injections of 0·4 g. before the luetin test was repeated in each case. Nine of the patients gave a positive luetin test on repetition, and eight responded negatively. Intravenous injection of cacodylate of soda acted in the same manner as arsphenamin, only more feebly. A study of the influence of the intravenous injection of arsphenamin on the Pirquet test showed that arsphenamin acted on the tuberculin test in the same way as it had acted on the luetin test, as in three out of ten cases a previously negative Pirquet test became positive. On the other hand, the anaphylactic food test made by either the endermic or scratch method did not seem to be influenced by the intravenous administration of either arsphenamin or cacodylate.

SILVER SALVARSAN.

Dr. H. E. Michelson and Dr. David M. Siperstein,[2] of the University of Minnesota, discuss the therapeutic value of silver salvarsan or silver arsphenamin as it is known in America. The drug was suggested by Ehrlich shortly before his death, and first used clinically by Kolle in March, 1918, since when it has enjoyed a considerable vogue in Germany, but does not appear to have been used to any extent in this country or in the United States. From a study of the literature and their personal experience of a limited number of cases, the writers conclude that silver salvarsan is an efficient spirochæticide which has a pronounced effect upon the visible lesions of syphilis. A distinct advantage is the absence of the characteristic and often nauseating garlic-like odour noticed by the patient when receiving other forms of salvarsan intravenously. The effect of silver salvarsan on the Wassermann reaction is variable. As a rule, however, in recent syphilis a positive reaction becomes negative after the first course of from six to ten injections of silver salvarsan. Authorities differ considerably as to the optimum dosage. An initial dose of from 0·05 to 0·1 g. for a person of average weight is best with a routine dose of from 0·2 to 0·25 g. The following technique is recommended by the writers: Dissolve the necessary dose in 10 c.cm. of sterile distilled water, draw into a 20 c.cm. Luer syringe, puncture the vein, aspirate about 10 c.cm. of blood, and re-inject the entire solution slowly. The interval between the injections should vary from four to seven days, and the number of doses in a series varies considerably. There is apparently no reaction peculiar to silver salvarsan which has not been noticed with any of the other salvarsan preparations. No authentic case of argyria has been reported. Immediate reactions are about the same as with the other forms of salvarsan, but it is too early to speak with certainty of remote dangers.

[1] Archives of Dermatology and Syphilology, August, 1921.
[2] Ibid.

POTT'S DISEASE IN ADULTS.

THE recent tragic death of Mr. H. G. Hawker in an aeroplane crash was a reminder that tuberculous disease of the spine is not a very rare condition in the fighting forces. In the *Archives de Médecine Militaires* for May Lieut.-Colonel Courboulès reported from a hospital at Metz 140 cases of Pott's disease under treatment among soldiers and ex-soldiers aged between 20 and 50, during the period from March 1919 to June 1920. He makes a convenient summary of the salient features of the disease. In soldiers it only rarely develops acutely; one man did over two years' service in the artillery without a day's illness, complained of a swelling in the abdomen which, opened 10 days later, was found to be associated with disease of the dorsal vertebræ. Eighteen were correctly diagnosed at once. Many had suffered from lumbago, rheumatism, or sciatica, with no pathognomonic localising symptoms even for as long as 15 months. Rarely they are ascribed to accidental injury. Hernia, chronic appendicitis, ischio-rectal abscess, even gastric ulcer were accused as causes of the condition. The signs are curvature, paraplegia, abscess; pain is rarer than in children, and loss of function comes on more gradually in the adult, whose disease begins most frequently in the lumbar region, which was concerned in over 100 of this series. One case sent in had really a lipoma over the dorsal region and a malignant tumour of pancreas and liver. Cold abscesses (abcès pottiques) existed in 109 cases, mostly lumbar, iliac, or femoral, but two were perineal and two were retro-pharyngeal. Their course was incalculable; one with a femoral fistula also opened into the bronchi, but that was in a child. The characteristic constrained attitude with stiffness of the back, obvious when a patient tries to pick up an object off the floor, helps in diagnosis, which X ray examination facilitates materially. The treatment is rest in bed, extension, and Sayre's plaster jacket. The abscess must be opened by puncture under stringent aseptic precautions. Cure may follow Carrel-Dakin treatment; 12 cases of such recovery are mentioned, but even that may fail. Some recover unexpectedly, the general condition having improved. A cure cannot be ensured under two or three years of immobilisation. There is hope in bone grafting along the sides of the vertebral processes, fusion of which is the natural cure. Mr. Tuffier has even planted a graft from the occipital bone along the cervical spines, but Colonel Courboulès commits himself to no opinion whether surgical treatment brings cure more quickly and more certainly than does immobilisation.

THE CHOICE OF DENTAL ANÆSTHETICS.

THE latest issue[1] of the National Anesthesia Research Society's bulletin, a periodical which bears constant testimony to the enthusiastic pursuit in America and Canada of improvements in anæsthesia, is largely occupied by a paper on dental anæsthetics. The author contrasts the advantages and disadvantages of nitrous oxide and oxygen with analgesia by local injection. He believes that the former is "undoubtedly the superior method in the vast majority of cases." He is, however, at pains to point out that more skill is required of the operator during the anæsthesia of nitrous oxide and oxygen than during the leisurely operating possible with an effective analgesia. We gather that dentists in America concern themselves with the administration of anæsthetics to a greater extent than is usual, at any rate in big towns, in this country. For the writer remarks that it behoves all dentists to "acquaint themselves with the correct methods of administering nitrous-oxide-oxygen." That the present practice is not altogether satisfactory, however, we deduce from the observations of the chairman of the National Dentist Association meeting. He observed that the regrettable accidents of the past were all due to anæsthesia, and that the "surgeon should insist that the anæsthetic be given by a professional anæsthetist and not by an interne or by someone who gives anæsthetics as a side line. We should only trust our anæsthetics to professional anæsthetists for the reason that they are not interested in surgical technique and therefore are not likely to neglect their patients." There are, of course, innumerable occasions when such an ideal arrangement cannot be carried out, and in this country many dental anæsthetics are given by practitioners without special experience. There is a growing tendency to recognise the fact that even these comparatively minor operations involve the patient, as far as the anæsthetic is concerned, in a certain amount of risk. The patient, however, naturally weighs risk against discomfort, and it is probably true that a number of people would greatly prefer to take a minute risk from gas rather than undergo the discomfort of local anæsthesia. The prodigious crunching noise, the anxiety engendered by previous experience or by the recitals of other sufferers, the prospect of swollen gums, these minor but still appreciable ills make "freezing"—as it still appears to be called—unpopular among those who take nitrous oxide well. Doubtless the more complete the anæsthesia, the more satisfactory and painless will be the operator's endeavours. But the last word has not yet been said on a choice in which the public is very keenly interested.

[1] Current Research in Anesthesia and Analgesia, 1921, Bulletin No. 13.

THE REGULATION OF THE REACTION OF THE BLOOD.

AN elaborate communication by Dr. C. Lovatt Evans to the current number of the *Journal of Physiology* describes experiments dealing with the relative parts played by various modes of buffering in the blood in regulating its hydrogen-ion concentration, this concentration being determined by the indicator method described by the author and Dr. H. H. Dale. The term "reaction of the blood" is understood to mean the reaction of the plasma (or serum), as it has been shown that there is no difference between the reaction of blood and that of its plasma under identical conditions. The methods used for the blood of man, goat, and horse are fully described. The view that the reaction of plasma, like that of a bicarbonate solution, is dependent on the ratio $NaHCO_3/CO_2$ is confirmed; it is shown that the actual reactions of the plasma and of a bicarbonate solution of identical bicarbonate content are not identical; the plasma is more acid than the bicarbonate solution at the same CO_2 pressure, the difference being due principally to the sodium chloride present in the plasma. The influence of the proteins of the plasma is very small, and there is no evidence of any buffering action by the proteins. Plasmas from different bloods and of different alkali reserves have CO_2 reaction curves parallel to one another. The carbon dioxide reaction curves for different bloods are not usually parallel with one another; the discrepancies are due to differences in the hæmoglobin content, and in the extent and range of the ionic interchange between corpuscles and plasma (secondary buffering), and to somewhat capricious chemical alterations in the corpuscles on standing, whereby the secondary buffering is liable to modification. The greater the hæmoglobin content (and the lower the alkali reserve of the whole blood) the flatter the reaction curve of the blood tends to become. Although the CO_2-fixing capacity of blood falls off on standing, it is the corpuscles which, at a given pressure of CO_2, are most affected. The reaction of a blood is that of its "true plasma." Owing to the secondary buffering, the reaction of the "true plasma" alters less rapidly than that of separated plasma when the CO_2 pressure is altered. Plasma and blood, like bicarbonate solutions, are at the same CO_2 pressure more alkaline at higher temperatures, owing to the reduced solu-

bility of carbon dioxide. In the same number of the *Journal* Dr. J. S. Haldane records attempts to produce an acidosis in man and to study the corresponding symptoms. He found that ingestion of ammonium chloride in man causes marked and prolonged acidosis. The symptoms include fall in the alveolar CO_2 and in the blood's CO_2 capacity, and increased excretion of acid, ammonia, and phosphates. This is probably due to the conversion of part of the ammonia into urea, thus freeing the acid which has been combined with it. The depression of alveolar CO_2 below a certain value is roughly proportional to the rate of excretion of acid plus ammonia. The ratio of acid to ammonia in the urine depends on the amount of phosphates available for excretion. This amount falls during acidosis.

THE REFRACTORY IRIS.

THE Vienna School of Ophthalmology recently celebrated the seventieth birthday of Prof. Ernst Fuchs in a special number of the medical journal.[1] Among the numerous articles on ophthalmic subjects is one purporting to answer a question which must often have puzzled those who do refraction work. Why is it that the action of homatropine as a mydriatic, though entirely satisfactory in the great majority of cases, is in a few uncertain? The answer suggested is that in the eyes of certain people the anterior surface of the iris is more or less devoid of the crypts that are normally present, that in these cases the surface is comparatively smooth, and further, that these exceptional irides are exclusively found in brown eyes. This formation of the iris, though it cannot prevent the absorption of atropine, may partially or in exceptional cases completely prevent the absorption of homatropine. Dr. G. Guist, the writer of the article, found that in 24 out of 9500 patients homatropine completely failed to paralyse the pupil, whereas atropine succeeded. Whether or not the reason suggested by him is the true one should be easily ascertainable if the attention of a sufficient number of workers at refraction is directed to the subject. Paralysis of the pupil of course is not the same thing as paralysis of the accommodation, but the two conditions are intimately connected. If the explanation offered is correct, stubbornness to homatropine should be far commoner among negroes than among white people, and, so far as is known, this appears to be the case. In confirmation of his theory the author cites three cases of heterochromia in which the blue iris was easily paralysed by homatropine, whereas the brown one remained resistant, or nearly so, to the drug.

KERATOMALACIA IN RATS.

EVERY physician knows the importance of an appropriate and adequate diet in certain diseases of the eyes and eyelids, and the study of deficiency diseases in recent times has shown an intimate connexion between a lack or want of vitamin A in the food and the occurrence of certain nutritive disorders of the eyeball. Observations in this connexion have been made by Knapp, Falta and Noeggerath, and T. B. Osborne and L. B. Mendel. The last-named workers have extended their observations,[2] and find in their feeding experiments on young rats that these changes in the eyeball—keratomalacia, xerophthalmia—occur *only* in the absence of vitamin A in the diet. Among 1000 rats, those fed on a diet free from vitamin A showed these pathological eye phenomena, whilst of other rats fed so as to be but poorly nourished, on food containing vitamin A, not a single animal showed keratomalacia. That this condition is not the consequence of simple malnutrition is further shown by the fact that the eye symptoms usually begin before there is a decrease in body weight. In 61 cases, 33 animals showed the phenomenon before there was any loss of body weight, 15 before the loss of body weight reached 10–20 g., and 13 before the body weight loss reached 20–30 g. A daily addition of 0·1 g. of butter fat or vegetable oil (extract of plants, grass, alfalfa, spinach), caused the diseased state of the eye to disappear in two weeks, and a local improvement of the condition in cases where death could not be prevented. Isabel M. Wason has determined the pathological histology and bacteriological condition of some of these cases of keratomalacia. In all there was hyalinisation or necrosis of the outer layers of the corneal epithelium, œdema and infiltration of the epithelium and stroma, and proliferation of the blood-vessels and fibroblasts. In advanced cases the anterior chamber and occasionally the posterior chamber of the eye were involved. Staphylococci, streptococci and pneumococci, and pseudo-diphtheritic bacilli, or "diphtheroids," were found in the conjunctiva. But, so far, there is no explanation as to how the absence of vitamin A in the diet brings about such localised and specific changes in the superficial structures of the eyeball.

[1] Wien. med. Wochenschr., June 11th.
[2] Journ. of the American Med. Assoc., 1921, lxxvi., 905.

THE TREATMENT OF SLEEPING SICKNESS.

THE serum treatment of trypanosomiasis is based upon similar work in syphilis of the central nervous system. Although this line of treatment was received with considerable enthusiasm some six or seven years ago, it is now generally admitted that salvarsanised serum exerts little or no action upon syphilitic lesions of this specialised tissue. The intrathecal injection of salvarsanised serum in trypanosomiasis was originally proposed by Andrew Balfour in 1913, and was tried by R. A. L. Van Someren in Uganda on a small scale with inconclusive results. To the *Deutsche med. Woch.* (1914, xl., p. 203) Reichenow contributed an account of inconclusive results in a considerable number of cases treated by this method in the German Cameroons; from private sources we learn that this form of treatment has also been given a trial on the Congo. Dr. C. H. Marshall has published some remarkable results; 52 natives and one European under his care were apparently cured of their infection by the intrathecal injection of varying quantities—from 1 to 10 c.cm.—of their own salvarsanised serum. These results were summarised in a paper read before the Royal Society of Tropical Medicine and Hygiene on May 20th, 1921, when an interesting discussion followed his paper. The advocates of this method of treatment are convinced that the presence of trypanosomes in the cerebro-spinal fluid is the main factor in the production of the sleeping sickness state, and that by the introduction of the salvarsanised serum into the spinal canal the parasites can be destroyed. They do not claim that salvarsan or its derivatives exercise any special trypanolytic action, but that such action is possessed by the serum abstracted from the patient's blood three hours after an injection of 0·6 g. of neokharsivan.

The assumption that trypanosomes are invariably present at some time or other in the cerebro-spinal fluid is by no means generally accepted; their appearance in this situation may be entirely fortuitous. Stevenson has demonstrated to the Royal Society of Tropical Medicine and Hygiene these bodies lying outside the blood-vessels, in sections of the cerebral cortex and other organs of experimental animals. Very recently Clapier[1] has found them in large numbers in hydrocele fluid (in this instance it was not claimed that *Trypanosoma gambiense* was the cause of the condition, as these bodies may possibly invade and multiply in any collection of serous fluid). The arguments in favour of a serum treatment of trypanosomiasis have been ably put forward by Prof. J. W. H. Eyre and Dr. Marshall, and it is now proposed to apply this method on a much extended scale. The Colonial Office has approved of the proposals made by a recently formed body—The Tropical Disease Prevention Association—to send a special mission, at an outlay of £50,000, to investigate the serum treatment of trypanosomiasis in man and

[1] Bull. Soc. Path. Exot., July 13th, 1921.

animals. The chief medical officers, Dr. Marshall and Dr. S. Vassallo, will have the assistance of two junior colleagues, two veterinary surgeons, and a secretary, and the object of the mission is to carry out treatment of infected cases by the serum method, with such experimental variations in technique and general principles as may suggest themselves, and to make general observations on the pathology of the condition, with a view to prevention and immunisation in man and animals. As the expedition is to be organised on such a broad basis, we would suggest that attention be also paid to the action of trypanocidal drugs, such as the organic compounds of antimony, and to the remarkable new compound known as Bayer 205. Mayer and Zeiss[2] have shown that in experimental animals this drug has a direct action upon the trypanosome, whether given subcutaneously, intravenously, or into the stomach. They have also shown that the drug is comparatively non-toxic, and that it exerts a prophylactic as well as a curative action, though in vitro it exhibits no marked predilection for the trypanosome. It is claimed that this drug far excels all known trypanosome remedies, for it confers a protection against fresh infection which lasts for months. We understand that these somewhat astounding results are now being confirmed in this country, and that the minimal lethal dose is perhaps more than one hundred times greater than the therapeutic dose. It may be that upon these lines ultimate success will be attained, and it is perhaps in this direction that the new sleeping sickness commission will ultimately move. A concerted investigation will certainly stimulate fresh interest in this terrible scourge of Africa, and we wish the proposed expedition every success in its labours.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

THE following appointments have been made:—Surg. Comdr. J. S. Austin to the *Caroline*. Surg. Lieut. W. J. McB. Allan to the *Dolphin*.

Surg. Lieut. A. C. Anderson to be Surg. Lieut.-Comdr.

ROYAL ARMY MEDICAL CORPS.

Maj.-Gen. J. B. Wilson retires on ret. pay.

Maj. W. Byam retires, receiving a gratuity.

Capt. J. E. Brooks is secd. for service under the Colonial Office.

Capt. A. R. F. Clarke is secd. for service with the Egyptian Army.

TERRITORIAL FORCE.

Capt. W. Barclay to be local Maj. whilst specially empld.

Capt. H. F. Humphreys to be Maj.

Lieut.-Col. J. McKie resigns his commn., and retains the rank of Lieut.-Col., with permission to wear the prescribed uniform.

Maj. R. B. Carslaw resigns his commn., and retains the rank of Maj.

Capt. J. W. Anderson resigns his commn., and retains the rank of Capt.

Capt. C. H. A. Alderton (late R.A.M.C.) to be Lieut., and relinquishes the rank of Capt.

Capt. J. B. Bate and Capt. J. A. Cooke, having attained the age limit, are retired, and are granted the rank of Maj.

Capt. J. K. Lund to be Maj.

Capts. A. D. Low (late R.A.M.C.) and D. O. Macdonald (late R.A.M.C., Spec. Res.) to be Capts.

J. S. Pegum (late Unattached List, T.F., O.T.C.) to be Lieut.

Capt. R. A. Quinn (late R.A.M.C.) to be Lieut., and relinquishes the rank of Capt.

2nd N. Gen. Hosp.—Capt. A. L. Whitehead, having attained the age limit, is retired, and is granted the rank of Maj., with permission to wear the prescribed uniform.

1st W. Gen. Hosp.—Capt. H. Armstrong, having attained the age limit, is retired, and retains the rank of Capt.

ROYAL AIR FORCE.

Flight Lieut. H. J. Swan relinquishes his temporary commission on ceasing to be employed, and is permitted to retain the rank of Capt.

[2] Archiv. f. Schiffs u. Trop. Hyg., 1920, xxiv., No. 9, 257–294.

ALPINE AND SUBALPINE CLIMATIC TREATMENT.

I.—THE PLACE OF ALPINE SPAS IN MEDICINE.

By E. BOSDIN LEECH, M.D. CAMB., F.R.C.P. LOND.,
HONORARY PHYSICIAN, MANCHESTER ROYAL INFIRMARY.

SWITZERLAND abounds in spas; there are said to be 108 health resorts in this small country. When considering that small section of these which is visited by British patients, it is fair to remember the existence of the others. The Swiss spas correspond, so far as their waters are concerned, to those of the surrounding countries, and the medical officers of the spas of Switzerland only follow the suit of their colleagues in other countries when they recommend their own spas for nearly every type of illness. It is therefore essential in choosing a spa to sift the special from the general and to recognise that a place is not made by the exact amount of salt in its waters.

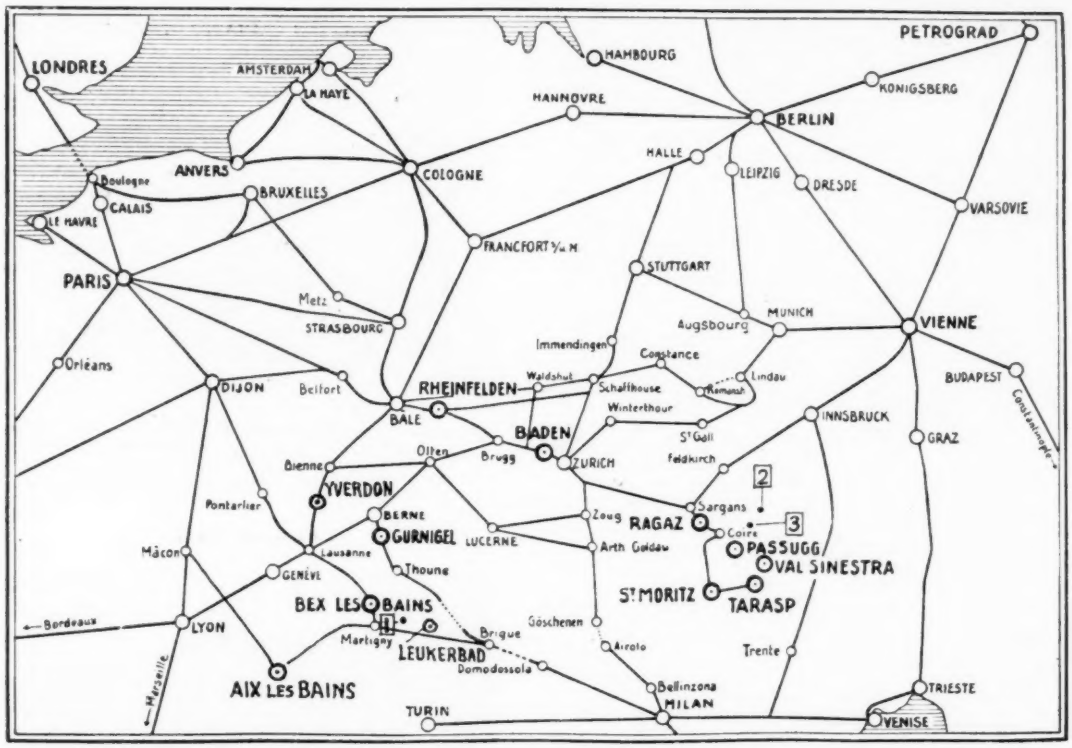
Two Great Assets of the Alps.

The Swiss spas possess, in varying degrees, two great characteristics, and it may be said safely two great assets, which stamp them and which cannot be neglected in estimating their value; whatever advantages accrue from the constituents of the waters, these are present in addition. One of these is altitude. Switzerland begins where other countries leave off. Baden-les-Bains (to be distinguished from Baden-Baden in Germany and Baden in Austria) lies at 1250 feet; St. Moritz, the highest, at nearly 6000 feet. We may choose a spa for its waters or its establishments, but a stay has only to be made at Tarasp, St. Moritz, or Montana, to realise what an asset is the freshness and sunshine of the mountain air. The advantage of high altitudes for tuberculous cases is proved by the records of Montana, Leysin, Arosa, and Davos; the advantage of high altitudes for other diseases is not so well recognised, but is present nevertheless for many of these. The other great claim of Swiss spas on the attention of the world is the beauty of the surroundings; the special beauty of what may be called the Swiss mountain type cannot fail to react favourably whether like hospitable Lucerne on the tourist or restful Pontresina on the invalid. This asset of scenery cannot be left out of count.

Any plan adopted would fail to place even the important resorts into exact groups, but the following rather rough classification will be helpful. The spas may be divided into: 1. Those which depend largely on their waters. 2. Climatic resorts (*a*) for tuberculous cases, (*b*) summer resorts, (*c*) winter resorts. The first class is mainly considered here, but a few points may be mentioned with regard to the others. Tuberculous patients should be sent only to those centres where the treatment of tubercle is paramount, and non-tuberculous patients should avoid places where tubercle is admitted, especially those places which, professedly simple health resorts, admit convalescent or "healed" tuberculous cases. On the one hand, phthisical patients are liable to relax the necessary discipline when they are in sports or tourist centres, and on the other hand compulsory disinfection of rooms is only carried out where the presence of tubercle is officially recognised.

General Character of the Spas.

Sanatoriums in the tuberculosis centres are thick on the ground and usually are well furnished and well managed. There are some institutions in non-tuberculosis centres for the exact diagnosis and treatment of digestive and metabolic diseases; the Chantarella at St. Moritz is an excellent example of these. Practically all the spas have a summer season only, early June to late September; only some of the upland places as Pontresina and St. Moritz have both summer and winter seasons, the former contemporaneous with the tourist season, the latter with that of winter sports. The sanatoriums cater for patients the



Railway map showing direct routes from surrounding continental countries to the climatic health stations of Savoy and Switzerland. The position of three Alpine tuberculosis resorts is indicated by a figure in a square frame: 1, Montana-sur-Sierre; 2, Davos (via Landquart); 3, Arosa (via Coire).

whole year round but are only largely patronised in winter.

In the spas the baths and fittings are generally good, though without the magnificence of Harrogate and Bath. Baths, douches, and electrical treatment of all the recognised types are in general use. Several of the waters are hot; perhaps the advantage of being treated by naturally hot waters is, for the patient, mental rather than physical, but in a country where coal may cost £20 a ton, hot springs and water-made electricity are important. Leukerbad, one of the lesser winter sport centres, promises a natural hot bath to the devotees of sport when the day is done. The cold springs generally contain CO_2, so that one of the factors of Nauheim treatment is at hand. The springs are generally only feebly radio-active, but the waters of Disentis (at the top end of the Vorder-Rhein valley) and Baden are the most active.

The Upper Engadine (St. Moritz and Pontresina) with its fresh air affords an excellent after-cure both for patients who have undergone treatment at Tarasp in the Lower Engadine and also for patients who have completed sojourns at the spas of other countries.

The principal Swiss spas, then, may be classified as follows; in parentheses some of the corresponding spas in Great Britain or on the Continent are given:—

Sulphated waters.—Tarasp. (Cheltenham, Leamington' Marienbad, Karlsbad, Kissingen.)

Alkaline carbonated waters.—Passugg. (Cheltenham, Vichy, Ems.)

Carbon dioxide waters.—St. Moritz, Tarasp.

Iron waters.—St. Moritz, Tarasp. (Tunbridge Wells, Pyrmont.)

Arsenical waters.—Val Sinestra. (Levico, La Bourboule.)

Sodium chloride waters.—Rheinfeld, Bex. (Droitwich, Nantwich.)

Sulphur waters.—Baden, Gurnigel. (Harrogate, Strathpeffer, Aix-les-Bains.)

Simple thermal waters.—Ragaz, Leukerbad. (Bath, Buxton, Plombières.)

Individual Features.

The following notes are largely based on personal experience:—

Tarasp, 3900 feet, situated in the river gorge which runs along the wide valley of the Inn; well protected from winds and with small rainfall. Waters used for bathing and drinking. Two springs are purgative with sulphates, another contains iron; all are cold and contain much free CO_2. The hotels both here and at the contiguous Vulpera are good; the baths are excellent. Schuls, which lies close by and depends on the same waters, is less expensive. There are many graduated walks suitable for invalids and mild heart cases. Summer season only.

Ragaz, 1700 feet, in the canton St. Gallen, close to the Upper Rhine and near the Austrian frontier. The water, which is very abundant, is brought from Pfäffers, which lies in a ravine in the mountains; it is hot, 98° F., and has a very small amount of solids; it is mainly used for bathing. The baths are good and of many types, including thermal swimming baths. Summer season only and most suitable in early and late summer when the weather is not too hot.

Leukerbad (Loèche-les-Bains), 4600 feet, at the head of a side-valley off the Rhone, surrounded by high hills. The waters are abundant from several springs and hot; one has a temperature of 123° F. Both the baths and hotels are less luxurious than in many other spas, but the hotels are quite comfortable and the baths are adapted for the special type of bathing practised, the patients staying in the water for six hours or even more. The treatment is largely used for chronic itching diseases of the skin. Besides the summer bathing season there is a winter sports season, December to February.

St. Moritz, 6000 feet, the highest of the big health resorts, magnificently situated in the open valley of the Upper Engadine, formerly accepted tuberculous patients but now does not cater for them. In addition to winter sports, which are well known, it possesses iron and CO_2 waters which are hardly known enough, and the resort merits more recognition than it has received for convalescent cases. The waters are cold and the CO_2 springs are said to be the strongest in Europe. The hotels are numerous and luxurious and the baths well up-to-date. The baths are frequented June to

September, but the hotels in St. Moritz Dorf are open the whole year.

Pontresina, 5900 feet, not far from St. Moritz, is a health resort of the first order which owes its pre-eminence to the pure invigorating air and beautiful surroundings. It possesses no special waters, but is an ideal place in summer for convalescence or for an after-cure. The opportunities for winter sport are good and in this season it is likely to be frequented much by English visitors. Consumptives are not catered for.

Montana, about 4800 feet, lying above Sierre in the Rhone valley, on the open hillside and with a magnificent view, is becoming more and more a centre for tuberculosis. The proportion of English patients, who centre round the Palace Hotel, is a big one. Opportunity for the milder exercises, suitable for consumptives, is provided without the temptations of a recognised sports centre.

Arosa, 6000 feet, situated in a basin in the mountains of the Grisons canton, and thus effectively protected from winds, is a leading resort for tuberculosis. Sports, as at Montana, are within limits which are not likely to lead patients away to harm. The treatment of tubercle is taken wholeheartedly and the medical fittings of many of the sanatoriums are very good.

Davos, 5200 feet, in the Grisons, in a broad, smiling valley, is the oldest of tuberculosis centres. It possesses a great number of sanatoriums. One may mention the magnificent and well-managed sanatorium, the Schatzalp, and its kindly director, Dr. E. Neumann, and one may mention, too, with sadness the fine Queen Alexandra Sanatorium for persons of small means, restricted to English-speaking nationalities. Everything there is ready for further use, but it has been closed since the early part of the war and cannot be reopened for want of funds. Both these institutions lie well above the town. Davos is a centre for winter sports; there is a fairly large English population here.

Aix-les-Bains, Haute-Savoie, France.—This town possesses hot sulphur springs (113° F.). The baths are numerous and well-fitted. The renowned Aix douche involves simultaneous douching and massage and does not fail to quicken the circulation in the affected part. The surrounding country is beautiful with its mountains and lakes, and is historically interesting. The hotels are good; the casino and theatre help to make Aix, as is well recognised, one of the most typical and successful of continental spas.

II.—SWITZERLAND AND "NERVES."

BY S. A. KINNIER WILSON, M.D. EDIN., F.R.C.P.,
JUNIOR NEUROLOGIST, KING'S COLLEGE HOSPITAL.

PHYSICIANS, according to *Mr. Punch*, are divisible into two classes only—those who "run" their patients, and those whose patients "run" them. We all have encountered the type of patient, not exactly a rara avis, who meets every suggestion for treatment with a qualifying "but," and dominates her entourage, physician included, from her bed. Endowed with une faiblesse herculéenne she exhausts and annoys everyone except herself. In the bad old days before the Entente, an Englishman was once defined as "un monsieur qui gêne les autres chez lui, mais qui ne se gêne pas chez les autres," and, mutatis mutandis, the same is largely true of this type of patient in relation to his or her medical attendant. A positive nuisance such people may become, and that they should sometimes be cordially if secretly consigned to another place of residence need not occasion surprise. In contrast stands out the patient of the clinging type, who depends for sustenance on the mental and physical vitality of others, and who, parasite-like, digests what someone else eats. Both types are in reality "running" their doctor, and sometimes not much less than a mental earthquake is required to get them to see themselves as others see them. But the physician, properly so called, manages his patients as well as treats them; his savoir faire enables him to praise or blame, caution or encourage, accept or reject, not indiscriminately but with knowledge. We should cut a sorry figure were we to rack our brains for a convenient sedative or tonic for the love-sick maiden and fail to see the little god laughing at our discomfiture as he sits at the foot of the bed, or exhibit our favourite hypnotic for the city man's insomnia without taking the trouble to learn that he has a "deal" on, which may make or mar him for years.

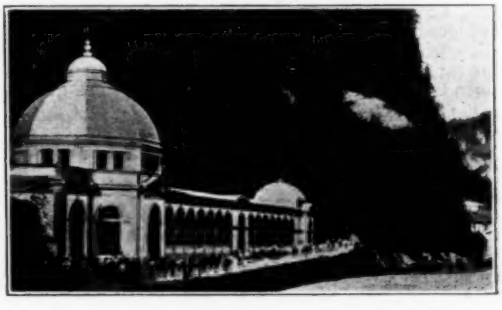
SUBALPINE CLIMATIC STATION.

Vitznau, a typical subalpine resort on the Lake of Lucerne, with the slopes of the Rigi behind.

THE HIGH ALPS.

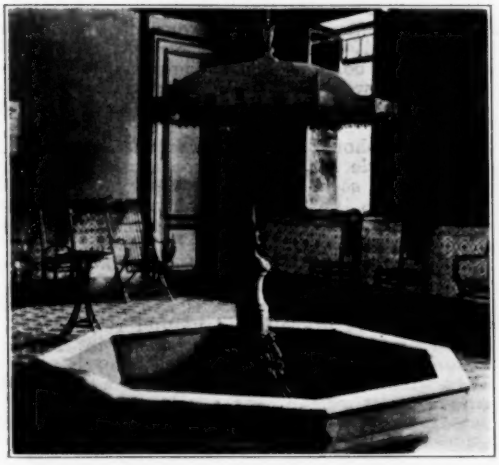
General lie of the baths and health resorts of the Upper Engadine. St. Moritz Dorf above, St. Moritz Bad below, the lake between.

TYPICAL BATHS.

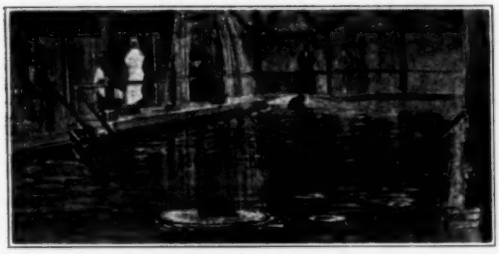


The pump-room and riverside promenade at Tarasp Vulpera in the Lower Engadine.

TYPICAL BATHS.



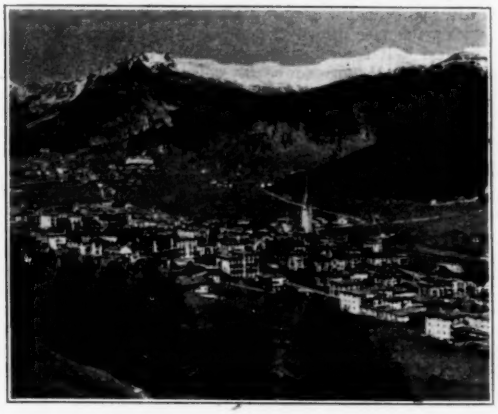
The inhalation room at Aix-les-Bains.



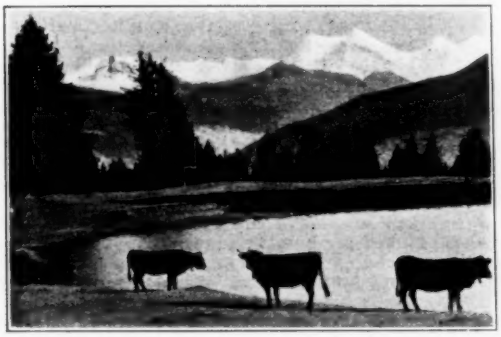
The old swimming-bath at Ragaz.

The great bath at Loèche-les-Bains.

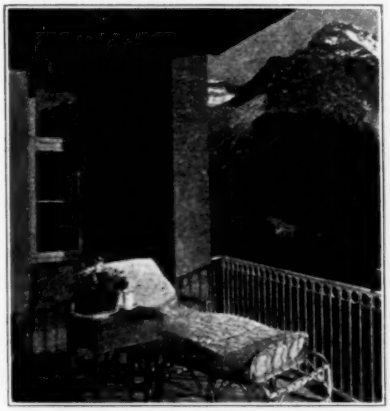
HEALTH RESORTS FOR TUBERCULOSIS.



Sanatorium treatment in the Alps. A general view of the Davos valley showing the position of the sanatoriums.



Montana in summer, showing the plateau on the north slope of the Rhone valley with sunny exposure and wide prospect.



The private balcony of a sanatorium at Arosa with distant mountain view.

Rest and Change.

Of course, when we have the wit to see that our inventiveness in therapy is beginning to run dry we can always counsel a rest and a change, and if we can do this with the air of the pundit the suggestion may be hailed with acclamation. But let us beware of facility herein. It scarcely serves to recommend a long sea voyage for our neurasthenic patient, only to be told that he has followed the sea for years, or to enjoin the depths of the country to another in whose hair hayseed can almost be seen. Rest is indeed change of occupation; otherwise how can we explain the rejuvenating effect on the "t.b.m."[1] of the Ziegfeld Follies at midnight, on a roof garden in New York? Some folk like crowds and are refreshed thereby, witness the popularity of visits to the metropolis by those who live in the country and need a holiday. Seaside people go inland, while town-dwellers rush to the sea. Each one, in short, wishes a specific antidote for his particular variety of out-of-sorts-ness, and the finding of this antidote is for the physician in many instances. Marion Crawford has said somewhere that for the sensualist there is Aix in Savoy and for the sybarite Wiesbaden; for the American there is every conceivable kind of Bethesda at a hundred different "Springs" in God's own country, but for the white in India, whatever his ailment, there are only the "hills." Well, there are hills at home too, and hills nearer home for the Londoner than the Himalayas. The man whose diurnal routine consists, largely, of a crowded rush amid a jostling mass of humanity flowing at 9.30 and ebbing at 5.30, and who is not deaf to the call in his heart's core, can be reminded of

> "The silence that is in the starry sky,
> The sleep that is among the lonely hills,"

and can in such an environment find time to readjust his values and learn there are other things in life than the clicking of tape machines.

And yet much depends on the make-up of the individual. One man's meat is another man's ptomaine. A scramble over the crags and through the bogs of Glen Sannox may be life-giving to one, and half-kill another. Ill-balanced enthusiasm for the long-looked-for holiday may result in one's going away for a change and having to come back for the rest. Caelum, non animum, mutant qui trans mare currunt. To send the claustrophobic to a shut-in valley, however delectable otherwise, and the agoraphobic to the moors and wide prospects of the uplands, is to court disaster; what is fascinating to the one may be appalling to the other.

Appropriate Choice a Fine Art.

Thus the choosing of a suitable holiday for our neurasthenic patients, an appropriate change of scene and occupation, is indeed a fine art. The individual has, in a sense, to be prepared if he is to obtain the maximum benefit from the change that is advised, and quiet counsel beforehand may prove of equal value to the actual break that is made in the tired life. A man may lose his taste for Nature, or he may, from a certain attitude of mind, fail to see and to assimilate the beauties that surround him. It was said of Huxley, I believe, that

> "Primroses by the river's brim
> Dicotyledons were to him,
> And they were nothing more,"

and if we have lost the child's gift of wonder we are in a bad way. We may be so accustomed to these very wonders of Nature that we never hear the waves beating on the shore, the ripples lapping in the reeds, never feel the winds or see the clouds for ever going over us. Yet to know once more that

> ". . . . . there, among the flowers and grasses,
> Only the mightier movement sounds and passes;
> Only winds and rivers,
> Life and death,"

is to feel an uplift of mind and body which is worth all else put together.

When, then, we are asked as physicians to advise in the matter of recuperation and reintegration by recourse to a thorough change and genuine rest, it behoves us to consider the individual patient, his likes and dislikes, his present manner of living and working, his capacity for appreciation, his ability to absorb and put to use the effects of externals on him. And, when we have appraised the different factors, we must be decisive in our conclusion. We must know the very place for him, we ought and should be able, further, to speak from some personal experience of what we recommend.

As a Scot, I should be a sorry specimen of the breed were I to belittle the claims of the north, or attempt to deny that I seem to breathe a larger and sneller air once I cross the Tweed at Berwick. In our perfervid praise of the country that bore us we sing of other, benighted, scenes that

> "None of them can possibly surpass
> *Our* weather and *our* heather and *our* sea,"

we speak of *our* Scottish bluebells, as though all these were unknown in other less favoured regions. Yet the finest heather I have ever seen was in Holland, and bluebells beside which the Scottish variety pales are to be found in Swiss uplands. And some Southrons may tell us that we can keep our weather.

A Rest-Cure de Luxe.

A recent visit, longer than on former occasions, to Switzerland, has given me the opportunity of seeing and learning more of the possibilities of the playground of Europe, not from the viewpoint of winter sport but as a country where may be found in prodigal variety all that gladdens the heart of the lover of nature, and that can be utilised in the process of dispelling the fatigue and revivifying the sensibility of the routine-deadened brain-worker. It is possibly because Switzerland is, in some measure, but Scotland on a larger scale that it makes its appeal to myself. Apart, however, from personal considerations that are scarcely pertinent, that country offers abundant occasion to the neurasthenic of regaining health and strength, and, from communion with nature, of coming to view life in its proper proportions. I do not mean merely that to step out in the morning to breathe an air like wine, to feel on one's face a wind like that in a ship's rigging, cold and hard and pure, or to bask in a sunny valley in a paradise of flowers, soaking in warmth and sweet scents, is all that la belle Suisse offers. No praise of mine is required to add to what many have known and loved for years. But, speaking more technically, the neurologist cannot regard it as a mere coincidence that some of the greatest names in psychotherapy and the cure of neurosis are Swiss, and he may be assured that the place has produced the men and its attractions the material, drawn from sources innumerable. From all quarters, north, south, east, and west, the current not only of pleasure-seekers but of health-seekers sets towards Switzerland, and no one who knows the country and its opportunities is likely to admit the possibility of disappointment. There are resorts, set like gems in the crown of the Alps, where every kind of technical treatment for functional nervous disease is carried out, as in the best of private homes and hospitals, and where, in addition, the neurasthenic may lie on a balcony and feast his soul on a panorama that has few equals the world over, where the low-toned tinkle of cow-bells, the smell of a new country, the sights and sounds that are unfamiliar, may each and all make an appeal through his sense avenues to aid in the general effect and lead to the general cure. Shall I say that it is a rest-cure de luxe? Amid a comparatively recent and occasionally somewhat ultra-enthusiastic drive in the direction of the psychological aspect of disorder of nervous function we are apt, as it seems to me, rather to minimise if not actually to forget what cures were obtained before psycho-analysis was born, and rather to look askance at any methodological technique that does not include rummaging in old, unhappy, far-off things. For some cases this is material, for others it is more than ordinarily immaterial. The vendor of patent powders advertises over his shop-door, "Leave

[1] American for "tired business man."

your headache here," and as long as the consulting room remains true to its traditions it will similarly be the gateway to renewed mental and physical health for the neurasthenic, via Switzerland, Scotland, Skegness, or any place soever, provided its occupier has a knowledge of human nature and a lore not gained from books.

III.—SWISS HEALTH RESORTS FOR TUBERCULOSIS.

BY A. NEVILLE COX, M.D. LOND., M.R.C.P. LOND.,
TUBERCULOSIS OFFICER, BRIGHTON.

THE Swiss health resorts fall into two classes: (*a*) those which cater for patients suffering from tuberculosis, and (*b*) those which do not accept such patients. This arrangement has manifest advantages. The non-tuberculous invalid has no grounds for the fear, however unreasonable such a fear might be, that he runs risks of infection from other patients; and the consumptive has the satisfaction of knowing that he is among his kind, and that he is not shunned by others. It is not suggested, of course, that none but consumptives go to the tuberculosis resorts. That is far from being the case, and indeed several of these resorts attract healthy winter-sport enthusiasts in large numbers. Some hotels at Davos and elsewhere do not accept invalids, and in some others a part of the hotel is reserved for the healthy visitors.

The Climate and its Advantages.

All these tuberculosis resorts enjoy great advantages of altitude, abundant sunshine, and pure atmosphere. It is difficult to judge which of these factors is the most important, but it is undeniable that the combination of them produces remarkable improvement in cases of phthisis of the right type. It is obviously futile to send to the mountains consumptives with advanced progressive disease, intestinal ulceration, great dyspnœa, cyanosis, and the like grave symptoms. Hæmoptysis, on the other hand, is no contra-indication. Laryngeal cases also do well, if the pulmonary lesions are not too severe. Sanatorium physicians in Switzerland, as elsewhere, complain that patients are frequently sent to them too late.

It is not considered necessary for the patient, unless he is much enfeebled, to do the journey in easy stages, as was formerly recommended. Arosa is now easily reached from Chur by electric railway, which takes the place of the old six-hour journey by diligence. Montana, similarly, is now connected with Sierre on the main Simplon line by funicular. Davos is reached from Landquart by the Rhaetian railway. Each of these places has its special attractions. Arosa lies well sheltered and delightfully among its wooded mountains. Montana is perched 5000 feet up on a plateau on the north side of the great Rhone valley, facing due south a grand distant panorama of Alps. It lies just within the French-speaking part of Switzerland. There is a sanatorium staffed by English doctors and nurses, and for the healthy there is the attraction of a fine golf course. Davos in its valley is quite different from both, but has a charm of its own. It has also the advantage, from the point of view of some patients, of possessing the shops and social amusements of a considerable town. Each of these places has its enterprising "Kurverein," which is ever ready to supply information to intending visitors, and does valuable work in developing the amenities of the place. At Davos, for instance, the damage done by the avalanche of a recent winter has been repaired, and steps have been taken at great expense to prevent the risk of similar accidents in the future.

Equipment and Outline of Treatment.

Many of the great Swiss sanatoriums, even of those known as the "popular" sanatoriums, are planned on a lavish scale. This, of course, can be overdone, and is by no means essential to good treatment. But the ideal of extreme simplicity can also be overdone, and it is possible that in some cases in England cheapness in buildings and equipment is associated with cheapness in more important matters.

In regard to treatment at the Swiss sanatoriums, one is struck by the amount of individual supervision of patients. Each patient is usually seen by the doctor twice daily, and, of course, oftener if he is seriously ill. The hours of rest and the amount and times of exercise are all laid down for strict observance. All this is implied in the general term "Kur." It is perhaps an unfortunate word, since it suggests that very different thing, the anatomical cure of the disease. When we hear of a patient coming for the "cure" several years in succession, it sounds like a contradiction in terms. May it not be the lack of this constant and careful supervision in some of our English institutions which has brought the whole system of sanatorium treatment into some disrepute among us of late? Genuine sanatorium treatment in the average case is nothing more or less than an unremitting attention to every detail of the patient's life, an attempt to eliminate as far as possible every adverse influence retarding recovery, and promote every favourable influence assisting it. This is not an art to be acquired in a few months, yet we frequently see medical appointments at our English public sanatoriums advertised at salaries which cannot possibly attract good men for long. Often, too, it is stipulated that applicants shall be unmarried.

In Switzerland, much more importance seems to be attached to rest than to exercise, and the method of graduated labour does not appear to be in vogue. Walking is generally regarded as the best form of exercise. There is sometimes a difficulty in restraining the more energetic patients from taking too much part in winter sports, most of which are obviously unsuited. For the ambulant patients, about five hours' rest daily, lying on long chairs on the balconies, seems to be the rule. Rest before meals is insisted on; rest immediately after meals is not encouraged, and it is thought better at those times to take a little walk. From two to four each afternoon is in many places kept as a time of complete rest, with no talking, reading, or any occupation whatever. Patients on admission are kept for about a week in bed, and if the pulse and temperature are satisfactory, are then allowed to begin getting up. The method used in some American sanatoriums of keeping even afebrile patients in bed for six to eight weeks does not seem to be practised.

Special Methods.

Heliotherapy is everywhere condemned for pulmonary cases, except for certain chronic pleurisies, which it relieves. In the ordinary pulmonary case it is said to cause "congestion" and to provoke hæmoptysis. This apparently is not the experience in some of the Scandinavian sanatoriums: one author there states that the incidence of hæmoptysis in his institution has strikingly diminished since actinotherapy was started. In surgical tuberculosis, heliotherapy is, of course, extensively used with excellent results, when properly applied. No more than a drug like digitalis can sunlight, whether real or artificial, be used in treatment with success, if employed indiscriminately and without proper regard to dosage and idiosyncrasy. Dr. O. Bernhard, of St. Moritz, a pioneer in the scientific application of sun treatment, has summarised his experience in a recent article in *Tubercle* (August, 1921).

Of the more specialised forms of treatment, artificial pneumothorax is everywhere in considerable use, and probably applied in a wider range of cases than is at present customary in England. At one sanatorium I was told that some 12 per cent. of cases are found suitable for this treatment. As a main indication, assuming a unilateral lesion, definite evidence of breaking-down or cavitation of lung tissue shown, for instance, by the presence of elastic fibres in the sputum, was suggested to me. Patients in whom a pneumothorax is already established should go to the mountains just before a refill is due, so that the change in atmospheric pressure is not harmful; similarly, one

returning to the lowlands should be refilled to a higher pressure than usual before leaving.

The complications of artificial pneumothorax and those cases where a pneumothorax cannot be produced owing to adhesions are more thoroughly treated by surgery than is generally possible at present in this country. Various types of thoracoplastic operation, and the filling of cavities otherwise impossible to close, by paraffin wax or by transplants of fat, seem to be the operations mainly performed. I did not hear of any special operations for the division of adhesions. Most of the sanatoriums have now their own operating theatre, and practically all their own X-ray plant.

Tuberculin seems to be now used in a somewhat attenuated manner, and rather in those cases "which are strictly localised, and when the patient is 'sticking' and not getting on," to use the phrase of Dr. Bernard Hudson of the Palace Hotel Sanatorium at Montana, than as a routine.

A general impression of the Swiss resorts for tuberculosis suggests that though there may be many cases which would do equally well in this country, there are others where the undoubted climatic advantages of the Alps, the well-equipped sanatoriums to be found there, and the therapeutic renown of the mountains, are of inestimable service.

METROPOLITAN ASYLUMS BOARD: A COMPREHENSIVE REPORT.

To the annual report[1] for 1920 of the Metropolitan Asylums Board is appended a note on the constitution and duties of this Board which traces its history and development in succinct paragraphs. It was established in 1867, under an Act which empowered the Poor-law Board to combine into districts the unions and parishes of the metropolis for the purpose of establishing "asylums" for the reception of the sick, insane, or infirm. Successively under the control of the Poor-law Board and the Local Government Board, the Metropolitan Asylums Board is now composed of 73 members, of whom 18 are nominated by the Ministry of Health. The extension of its duties from the reception and relief of paupers suffering from fever, small-pox, or insanity (1867) to the present important and far-reaching activities has been gradual but continuous, and is a proof of the public confidence in the discretion of the Board. As regards infectious diseases alone, since 1911 the admission to the hospitals under certain conditions of non-pauper as well as pauper patients suffering from measles, whooping-cough, puerperal and other fevers, as well as those attacked by more classical infections, has effected an enormous change in the public conscience as regards the spread of infection. Moreover, under these newer regulations there is seldom a month when at least one of the hospitals under the control of the Board does not number a medical student among its patients, and the advantage gained is mutual. The instruction of medical students and of candidates for the D.P.H. is an important part of the work of these hospitals, and valuable public service is also rendered by the research and statistical departments. In connexion with the evergreen topic of the doubtful value of medical statistics unchecked by experts, a summary (p. 68) of the cases of mistaken diagnosis admitted into ten hospitals is of interest. Excluding the 45 uncertified cases and the 60 "admitted with mother,"—it seems somewhat harsh to include these in a table of mistaken diagnoses—there were altogether 2847 cases admitted in which the diagnosis was not confirmed on admission or after a period of observation; since the total number of patients admitted during 1920 was 35,916, the percentage of detected error is just under 8. The seasonal rise in infectious diseases started in the autumn of 1920 from a fairly high level, and in November, 1920, there were in hospital 8669 patients, 1511 more than the highest previous record. From present indications it is anticipated that a very heavy seasonal rise may be expected this year, and steps are being taken to prepare for this possibility.

Second only in importance to the work of the Board in providing segregation and treatment for patients suffering from epidemic and sporadic infectious diseases is its recently acquired responsibility for the treatment of persons suffering from tuberculosis. On May 1st, 1921, sanatorium benefit ceased to be included among those conferred under the National Health Insurance Act, and the duty of providing institutional treatment having devolved upon the county and county borough councils, the Board has entered into arrangements with the London County Council under which it provides residential treatment for tuberculous patients in the county. A total of 1664 beds for adults in sanatoriums and hospitals is being provided by the Board and 1317 beds for children, including 883 for children sent through the boards of guardians. Inasmuch as the available accommodation approximates to the requirements independently estimated by the London County Council, the Ministry of Health has decided that the proposed extension schemes shall not be proceeded with for the present. The education, training, and after-care of tuberculous children is receiving special and expert attention, and suitable provision is being made also for the training of adults.

The present scope of the work of the Metropolitan Asylums Board is so vast and the reports on its various activities so enlightening, that it is difficult to choose for comment any special section. The classification of mental defectives and their segregation in various institutions according to grades, the residential treatment of women and girls suffering from venereal diseases, the isolation of cases of ophthalmia neonatorum in a special hospital, and the efficient ambulance service are described, and the functions of the Board with reference to these and other responsibilities appear to be efficiently administered. The source of the boys admitted to the training ships *Exmouth I.* and *II.* is not made clear, and the classification of tuberculous patients on different principles in successive tables (pp. 23 to 30) is confusing. Among the medical records included as appendices is one by Mr. T. B. Layton on the otological work done at the North-Eastern and Western Fever Hospitals, to which we shall have occasion to return; it is unfortunate that the concluding section of this important report, containing recommendations now under consideration, has been omitted. But considering the mass of material dealt with, the annual report of the Board is informative without oppressive bulk, and regret can hardly be felt for the omission of a certain amount of matter, however interesting, which has enabled it to be issued in such convenient form.

[1] Office of the Board, Embankment, London, E.C. 4. Price 5*s*.

GUY'S HOSPITAL BIENNIAL DINNER.—This dinner will be held on Oct. 26th at the Connaught Rooms, London. Mr. Montagu Hopson will preside, and tickets, price 15*s*., exclusive of wine, may be obtained from the hon. secretary, Mr. Arthur W. Ormond, 7, Devonshire-place, London, W. 1.

NORTH-EAST LONDON POST-GRADUATE COLLEGE.—The syllabus of a special post-graduate course, to be held at the Prince of Wales's General Hospital, Tottenham, from Sept. 26th to Oct. 8th, has been issued. Lectures on all aspects of medicine and surgery and the special branches will be given in the morning by members of the teaching staff of the hospital, and from 3 P.M. to 4 P.M. students will have access to the general hospital work. From 4.30 P.M. to 5.30 P.M. daily lectures on special subjects will be given by Mr. C. J. Bond, Dr. F. G. Crookshank, Mr. James Berry, Col. L. W. Harrison, Mr. H. W. Carson, Lieut.-Colonel W. Byam, Dr. Arthur Giles, Mr. H. D. Gillies, and Sir William Willcox; these lectures are free to all qualified medical practitioners. The fee for the course, to those not members of the Fellowship of Medicine, is 5 guineas, or 3 guineas for either week. Names of those wishing to attend should be sent, not later than Sept. 22nd, to the Dean at the hospital (or at 19A, Cavendish-square, London W. 1), or to the Secretary of the Fellowship of Medicine at 1, Wimpole-street, London, W. 1.

Public Health Services.

SCHOOL MEDICAL SERVICE.

Sheffield.

Dr. Thomas Chetwood reports that the routine medical examination of 24,488 children showed 22·5 per cent. of them to require treatment. Sheffield would appear to be a health resort for children, since only 3 per cent. were noted as anæmic and 2 per cent. as rickety. Yet the average height in the elementary schools, which may be taken as an indication of the whole past history of the child, is below standard, and the average of weight, which reflects present conditions, is still more below standard. Conversely the secondary schools are well above the usually adopted standards. These averages as given for the largest groups comparable are interesting enough to reproduce here.

Age in years.	—	Boys.		Girls.	
		Height.	Weight.	Height.	Weight.
12	Elementary schools	137·21	31·94	138·48	32·23
	Secondary ,,	143·05	34·75	144·10	35·01
13	Elementary ,,	141·47	33·45	142·42	35·07
	Secondary ,,	146·19	37·56	148·40	38·83

Excellent and detailed work is recorded in every department; only the notes on "school hygiene" are perfunctory and not quite worthy of the rest of the report. Here surely in this great University city there might be coördination with the University, which is an untapped source of enthusiastic workers ready for training and experience. 25 per cent. of the children had sound teeth, 44 per cent. having less than four teeth decayed. 11 per cent. had nutrition under average, 0·5 per cent. being classified as bad. During the year 176,000 school dinners, 189,000 breakfasts, and 97,000 teas were served in school and feeding centres. The employment of a few more dental dressers, in addition to three dental surgeons, should ensure an excellent dental service. 10,858 children out of 12,784 examined were found to require dental treatment, and of these 4874 obtained it. One-seventh of the cases were cured with an average of five attendances. The two open-air schools by means of which Sheffield helped to educate this country are reserved for ailing children. There are no classes for dull and backward children, and no nursery schools.

Excellent reports are given of the school baths, each of which serves 4000 children weekly. Swimming is taken as a physical exercise in the public baths. It has been found that in the douche bath rooms, unless the hoppers of the windows are open outwards instead of inwards the valve-like action prevents the rising steam escaping. The report calls attention to another risk of bathing, as does Dr. Dan McKenzie in our correspondence columns.

> "Several cases have occurred during the year of serious infection to the nose and ears in children attending the swimming baths. The danger of this infection is mostly to children who already have some discharge either of the ears or the nose. It has long been recognised that the entrance of unsterilised water into the ears in cases of otitis media constitutes a grave danger. That this is so in cases of nasal discharge is not so generally recognised, but it is fully as important."

A good analysis of loss of attendance from various causes shows coughs, colds, and bronchitis as responsible for 30·4 per cent., infectious disease 10·1, contagious disease 6·7, sore throats 3·8, debility and anæmias (which last we have already seen is so rare) 3·6 per cent.; illness in the home 4·5 per cent., chiefly in the girls' department. "This is not to be wondered at, when the figure given for illness of mother is as high as 3·4 per cent." Of possible attendances 13 per cent. were lost.

Northampton.

The Northampton authority is to be congratulated on a live and heartening report, which shows a breadth of view and a grasp of essentials deserving close attention. Dr. G. H. Skinner gives a general survey of school hygiene, showing still existent small diamond-shaped windows, long desks with seats without backs, and 92·6 per cent. of 5-year-old children unvaccinated. Attention is drawn to the necessity for what is called individual ventilation—a single desk for each child, so that a definite free air space of several inches is ensured for each. No defect treated has been counted twice, nor has any unremedied defect been counted over again during the period in which it remains unremedied. The census of cripples showed 10 per cent. under school age. Dealing with dental decay, the report urges:—

> "It must be borne in mind that the toothbrush used indiscriminately in a septic mouth acts as a spreader of disease, and by friction may convert chronic inflammation into the acute form; this might promote healing had the cause of sepsis been removed, but might have serious results if it had not; and on this account I am of opinion that toothbrush drill in school may prove to be a mixed blessing. . . . Fortunately, on account of the diffusion of knowledge as to the importance of cleanliness of the teeth it is not so necessary as it may have been in the past. All attempts at food reform must come to naught as far as school children are concerned unless the teeth are put in such a state that mastication is painless, and reform will then be a natural consequence in most cases, as the human being, like most mammalia, has always shown a desire to exercise his teeth upon resistant substances unless hindered by unnatural conditions which prevent him obtaining the mixed diet to which his teeth are suited. By treating incipient decay at the earliest possible opportunity with silver nitrate, most infants would present, and by subsequent supervision would retain, at least a fairly satisfactory milk dentition, which would not contaminate the permanent teeth, would preserve the space for their successors, and would enable the child to masticate more solid food. Otherwise slops must be given or the solid food is bolted; one tender tooth will throw out of action the whole masticatory apparatus."

It is also pointed out that dental treatment of children under 5 would probably enable a dentist to overtake 10,000 children instead of 5000 as at present.

Successful arrangements have been made for the treatment of speech defects. Two experimental nursery classes have been established as a preliminary to a nursery school. The transference of the X ray work to the school clinic has resulted in the number of ringworm cases at the end of the year being the lowest recorded. The total number of ear defects requiring attention was 429, and of that number 261 received treatment at the school clinic, with an average of 18 attendances, 52 per cent. being cured. Altogether 5515 routine and 3734 special examinations were made, and of these 4448 children were found to have defects, the number of defects requiring treatment being 6126; 94 per cent. of these obtained treatment, and 70·6 per cent. were cured.

In its grasp of essentials and its curtailment of non-essentials this report reaches high-water mark.

Nuneaton.

The number of children examined at routine inspection was 2035. Of these, 29 per cent. were found to be vaccinated, as compared with 43·3 per cent. in 1919. Of the girls in the 13 senior departments, 57 per cent. had verminous heads. The term verminous is rightly applied to children with one or more nits or pediculi in their heads; consequently the percentage is higher than in most school medical officers' reports. There are no nursery schools, no school baths, and no voluntary body exists except the Society for the Prevention of Cruelty to Children. 30·6 per cent. of 2035 children were found with perfect dentition. The arrangements for the treatment of ringworm with X rays should result in a marked diminution in the number of cases of this disease, which is at present too high. Arrangements for building a cleansing station for the treatment of scabies are in hand.

Dr. Middleton Hewat reports that every school in this area has a playing field, and every crippled child

has received attention at the Birmingham Orthopædic Hospital, to which the Education Committee subscribes.

ANNUAL REPORTS OF MEDICAL OFFICERS OF HEALTH.

Salford.

THE annual report for 1920, by Dr. C. H. Tattersall, on the health of the county borough of Salford, extends to over 200 pages. With an estimated population of 235,239, the total number of births was 6441 (3282 males and 3159 females), equal to an annual rate of births of 27·3 per 1000—a decided increase from 18·3 in 1919—and the highest recorded since 1911. The death-rate is the lowest ever recorded, being 13·7 per 1000, which compares very favourably with 15·8 for 1919 and 16·8 for the five years 1913–17. The total deaths were 3133 (1646 males and 1487 females) and the excess of registered births over deaths was 3308. Special attention was given by the health committee to housing matters and to the two housing schemes at Lower Kersal and Weaste. The question of a central hot water-supply to the houses was abandoned on account of the greatly increased cost which would be entailed. The provision of shops on these two sites was included in the original plans, but up to the time of writing the Ministry of Health had not agreed to allow shops to rank for Government subsidy, and therefore the committee did not feel themselves justified in throwing the whole cost on the rates. The question of concrete houses was considered very carefully as a means of building economically, but the conclusion was arrived at that concrete houses, if properly constructed, would cost as much as brick-built. Electricity is to be installed for lighting and gas for cooking.

The erection of a new tuberculosis sanatorium, giving accommodation for 120 patients, has been commenced, and, it is hoped, will be ready for occupation in 1922. A scheme has been drawn up for providing 50 beds at Ladywell for female patients who require hospital as distinguished from sanatorium treatment. Scarlet fever and diphtheria have been more prevalent than during the past three years, but there has been no alarming epidemic. The conversion of the privy middens in the borough has been practically completed. A table is given showing the number of conversions made during the past 20 years and a comparison between the incident death-rate of enteric fever and epidemic diarrhœa respectively. In 1900 there were 23,000 privy middens, 7254 pail-closets, and 14,876 water-closets, the corresponding numbers in 1920 were 25, 800 and 49,206. As to enteric fever the attack-rate per 1000 living at all ages in 1894–98 was 1·80 and in 1916–20, 0·21; and for epidemic diarrhœa the death-rate per 1000 of population in 1894–98 at all ages was 1·70 and under 5 years of age 14·90, while in 1916–20 the corresponding numbers were 0·47 and 0·41.

Six cases of encephalitis lethargica were notified, but three of these turned out to be tuberculous meningitis. Forty-two cases of malaria were notified, of which 3 died; all the cases were found to have contracted the disease abroad. The total cases of syphilis treated were 680 and of gonorrhœa 606 at Salford Royal Hospital, and 260 of syphilis and 264 of gonorrhœa in outside institutions. In connexion with child welfare and supervision of midwives, 109 cases of ophthalmia neonatorum were notified during the year, 56 of these by the medical staff of the Royal Eye Hospital. Ninety-two cases occurred in the practice of midwives. In 52 cases both eyes were affected, and in 57 cases one eye only. Of the 109 cases, one died; 106 recovered completely with no injury to sight.

Ilford.

A large proportion of the inhabitants of the urban district of Ilford, with an estimated population in 1920 of 82,693, earn their living in London, which is only seven miles distant. The population is mainly lower middle class. There are a few industries: (1) photographic works; (2) paper mills; (3) manufacturing chemists; (4) electric battery makers; (5) nautical instrument makers. In the interests of efficient local government, a town of this size ought to have control of its own tuberculosis scheme, and midwives. The health statistics are satisfactory, as might be expected in a town like Ilford, the general death-rate is 9·0, the infant mortality rate 54, the rate for diarrhœa under 2 years per 1000 births is only 2·4, as compared with 9·5 for London and 8·3 for England and Wales. The death-rate from phthisis showed the usual rise during the war but for 1920 it was 0·50, the total death-rate from tuberculosis being only 0·69. A great improvement in the treatment of tuberculosis has been made during the past year by the institution of dental treatment for tuberculosis cases.

In 1919 Dr. A. H. G. Burton and the surveyor estimated that the council should provide at least 600 houses to meet local demands, and satisfactory progress has been made with four housing schemes, comprising 356 houses. In addition to this, the City of London have a scheme for 2400 houses on the Lonsdale estate, and the London County Council a scheme for 3200 houses at Dagenham, both in the Ilford district. Ninety per cent. of the diphtheria and 89 per cent. of the scarlet fever cases were treated in the Isolation Hospital. There has been some difficulty in obtaining nurses.

The infant mortality rate among illegitimate children was 230 and Dr. Burton is certainly justified in thinking that the supervision of foster children should be transferred from the guardians to the maternity and child welfare department, as suggested in the Ministry of Health's circular of Sept. 30th, 1919. Of the 90 deaths of infants, 45 occurred in the first four weeks of life. Two more health nurses have been appointed and overlapping is avoided and travelling time saved by these nurses performing the duties of health visitor and school nurse. Two antenatal clinics were opened during the year and a dental clinic is available for mothers and for children under 5. Ten cases of ophthalmia neonatorum were notified. In two cases the children were left with serious impairment of vision in one eye owing to corneal opacities. During 1920 169 women were admitted to the maternity home; the fee is two guineas per week, a portion being remitted when necessary.

Dr. Burton is also school medical officer and advocates great care before advising operation for tonsils and adenoids. "Most cases of enlarged tonsils are associated with carious teeth, which should first be treated. Many slight cases can be improved by suitable breathing exercises. . . . Further, the operation is by no means free from risk, especially when it is done, as is frequently, in an out-patient department, and the child allowed to return home the same day." Satisfactory arrangements are made for the treatment of minor ailments and the number of children seen at the school clinic has gone up from 962 in 1919 to 1763 in 1920. Of 4188 children inspected by the dentist, 3025, or 72 per cent., were found to require treatment. The report of the organiser of physical training points out the inadequacy of the swimming-bath accommodation.

Chelmsford.

The Registrar-General's estimate of the population of the borough of Chelmsford for 1920 was 21,666. The birth-rate was 20·8; the uncorrected death-rate was 11·9, the "corrected" 8·8. The infant mortality rate was 55·4 and the total tuberculosis rate 0·55. There were no deaths from infant diarrhœa. Dr. William J. Cox draws attention to the river pollution in the district. Under the heading "Maternity and Child Welfare," he mentions that "109 mothers (25 per cent.) suffered from carious teeth to a serious extent" and that in about 45 per cent. of cases no cot was provided for the baby. Overcrowding, he states, remains much the same as during 1919. "The conditions caused by overcrowding in this borough are undoubtedly serious." There are 120 houses calling for early demolition which cannot be dealt with

owing to the acute shortage. At the present time there is a waiting list of about 600 applicants for new houses under the corporation scheme. The scheme, it seems, has been much hindered by the difficulties of obtaining building materials.

Herefordshire.

Dr. Herbert Jones's report on the Herefordshire Combined District for 1920 covers the rural districts of Bromyard, Dore, Hereford, Ledbury, Leominster, and Weobley, and the urban district of Bromyard. The estimated population of the 6 rural districts for 1920 was 47,086. The birth-rate was 25·2, compared with 17·5 in 1919. The death-rate was 13·5, the infant mortality rate 60, and the phthisis death-rate 0·89. An endeavour is being made to pool the infectious hospital accommodation of the districts and that of the city of Hereford in the interests of efficiency and economy.

Dr. Jones reports on many primitive sanitary conditions, such as cottages draining into road-side ditches, obsolete forms of drain-traps, and dip-wells liable to pollution. At the end of the report is a valuable leaflet on the economical construction of earth-closets. The combined district is just the area for their employment, and it is disappointing that so few people living in the country have as yet taken the trouble to master the simple principles necessary for the maintenance of a sanitary closet. In 1874, the State Board of Health of Massachusetts issued a report strongly recommending the earth-closet as a substitute for that "disgrace to civilisation," the country privy. Dr. W. Ramsay Smith, head of the South Australian Public Health Department, advocates them in a report published this year. As Dr. Jones says: "Wherever there are a few perches of garden attached to a house it is possible to replace a foul-smelling dangerous privy-closet by a harmless inodorous earth-closet." The public in general fails to appreciate the deodorising and purifying effect of earth suitably applied. No stinking privy should be dignified by the name of earth-closet. Dr. Jones's leaflet has been separately published by the *Medical Officer* and merits a wide circulation in country districts.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

Irish Labour and the Public Health.

IT is a healthy sign that, in spite of the distracting elements in Irish public life at the present moment, all parties are showing an intelligent interest in the public health. Under the auspices of Dail Earann several of the local health authorities have been putting forward schemes of reform of the Poor-law and Public Health Services which show evidence of careful consideration. And now labour is devoting its attention to the same subject. At the recent meeting of the Irish Trades Congress in Dublin the following resolution was unanimously passed:—

"That the National Executive be instructed to draw up, for the benefit of Labour members of local authorities, a comprehensive scheme of Public Health Service reforms, towards the attainment of which all Labour members of local authorities could use their influence."

In their deliberations the national executive of the Trades Congress should gain much help from a study of the report of the Irish Public Health Council.

Cancer Research in Dublin.

Ireland's high death-rate from cancer is well known. A concerted effort is being made to raise a sum of money to provide more adequate accommodation for cancer patients in the City of Dublin Hospital and to establish and equip a research department in connexion therewith. The committee formed in London to assist this Cancer Research Fund has Mr. J. McVeagh, M.P., as its chairman and Mr. Fredk. Spicer, F.R.C.S.I., as hon. secretary, with an address at 58, Warwick-street, S.W.

Household of the Lord Lieutenant.

The following medical appointments have been made to the household of His Excellency the Lord Lieutenant of Ireland:—Physicians-in-Ordinary: E. McD. Cosgrave, F.R.C.P.I.; Sir James Craig, M.D. Surgeons-in-Ordinary: Sir F. Conway Dwyer, F.R.C.S.I.; E. H. Taylor, F.R.C.S.I. Physician to the Household: Sir John Lumsden, M.D., K.B.E. Surgeon to the Household: Sir W. I. de C. Wheeler, F.R.C.S.I. Surgeon-Oculist, H. C. Mooney, F.R.C.S.I.

Correspondence.

"Audi alteram partem."

HYDROCYANIC ACID AND SANITATION.

To the Editor of THE LANCET.

SIR,—An annotation in your issue of July 16th (p. 146) refers to recent legislation in the United States, Italy, and Sweden on the use of hydrocyanic acid for fumigation of shops and buildings, based upon an article in the May issue of the *Office Internationale d'Hygiène Publique*. May I say that throughout South Africa this method is very commonly used for the destruction of bugs. From time to time there have been an appreciable number of fatalities, and, as regards Johannesburg and several of the Reef towns, this was specially the case in the years immediately preceding 1913. In Simonstown, some years ago, a pigeon fell dead while flying past a window broken with a stone to permit the egress of the gas after disinfection.

As our statutory list of "offensive trades" includes charcoal-burning and lime-burning, with which for this purpose cyanide fumigation is sui generis, I recommended its addition to the list of such trades and the adoption of stringent controlling regulations. This proposal was turned down as ultra vires by the then town clerk, but was eventually entirely upheld by the Government law advisers, and in January, 1916, regulations were adopted. Briefly, these provide for the licensing of such disinfectors; for the safety and supervision of their methods; for 24 hours' written notice of intention to disinfect (*a*) to the M.O.H., (*b*) to the occupier of the premises concerned, (*c*) to the occupants of any adjoining house, unless separated by a minimum open space of 50 feet; for the evacuaton of all apartments on the same or any upper floor; for putting out of fires and removal of all liquid or moist foods; for effectually closing or caulking all openings and crevices in the room under disinfection; for closing and locking it from the outside and placing upon it a conspicuous danger placard; and for opening the windows from the outside at least one hour previous to entry after disinfection. Every disinfector must be equipped with aromatic spirits of ammonia and with brandy, must be competent to apply artificial respiration, must dispose of the cyanide residue in such a way as to obviate danger therefrom (this is very important), and must keep under lock and key any cyanide stored by him. Basements, cellars, &c., which do not possess a door, window, pavement-light, or hatch opening directly to the outside air must not be disinfected with cyanide.

These stringent regulations were at first resisted or ignored, but, as the danger was very generally recognised in Johannesburg, a number of prosecutions with heavy fines quickly brought the disinfectors to heel, and the results up to date have been quite satisfactory. I may add that when framing these regulations I was unable to find any other code dealing therewith, but derived assistance from an article by Dr. Howard, of the United States Department of Agriculture (Bureau of Entomology—Circular No. 163, Nov. 29th, 1912). Our regulations have now been widely adopted, verbatim, throughout the Union.—I am, Sir, yours faithfully,

CHARLES PORTER,

August 10th, 1921. Medical Officer of Health, Johannesburg.

THE NATURAL HISTORY OF ENCEPHALITIS LETHARGICA.

To the Editor of THE LANCET.

SIR,—In regard to encephalitis lethargica I have a theory which I should like to put before the medical profession for their careful consideration, believing that if it stands the test of criticism and turns out to be true it may prove of considerable value. During the year 1918 I saw some 12 cases of this disease; they occurred mostly during the first three months of the year. Most of them were severe cases and very typical; about half of them died, and of those who survived one eventually found his way into an asylum, one took to drink, and one, a lad, became feeble-minded. A fourth, a child of about 8, still suffers from headaches, and is unable to make any progress at school or to get on happily with other children. In this year the disease was not a notifiable one, consequently statistics are not available. In 1919 I can only remember to have seen 4 cases; of these two died and two recovered, but one, a year later, was reported to be unable to attend school owing to headaches. Four other cases were reported. In 1920 I saw 3 cases, one of which was in December, but 7 others were reported to the Ministry of Health, making 10 in all. This year I have seen 12 cases and one other in which the diagnosis was somewhat doubtful; 11 others have been reported to the medical officer of health; one at least of these was doubtful. They mostly occurred in the first three months of the year and were then milder in character, but in June and July there were some fresh cases, and these were more severe ones. Those I have seen this year have conformed less to the type originally described than did those of 1918. These cases have been scattered all about the county. With the possible exception of the south-east corner, which I see but little of, no large area of the county seems to have been without one or more cases, yet hardly any case seems anywhere to have arisen in close proximity to any other case. They have occurred amongst rich and poor alike, and in remote country cottages and farms more often, I think, than in towns. The only point I would note, taking the four years together, is that an unduly large proportion have occurred amongst those whose work is connected with the railways.

All this suggests that the infection is very widely distributed. What are the connecting links between the cases? The two most probable suppositions are: (1) That the infection is spread by carriers—i.e., human carriers, who do not themselves show any symptoms of illness. (2) That there is a very widely spread and fairly common disease in our midst which only very rarely affects the central nervous system, just as tubercle only very occasionally causes meningitis or cerebral tumour. I believe the latter supposition to be the correct one. It certainly would account for the peculiar distribution of the disease far better than any other that has been suggested.

Now there has been this year another set of cases occurring in Shropshire very commonly, I believe, characterised more or less clearly by the following signs and symptoms.

1. Fever, sometimes sudden, sometimes gradual, or even insidious in its onset, of varying type, uncertain duration, and prone to recrudesce.
2. Sore-throat of a peculiar character.
3. Gastro-intestinal disturbances—generally vomiting and diarrhœa.
4. Broncho-pneumonia, with sharp crepitations at the bases of the lungs.
5. Often an erythematous rash on the body and legs, chiefly in the form of large red patches, but varying greatly and of short duration. This is by no means always noticed, possibly because of its transient nature and because it is not looked for.
6. Marked prostration and slow recovery.

The throat is characterised by slight swelling but very marked congestion of the fauces and pharynx; the colour is generally a deep crimson, but sometimes is almost vermilion. There is comparatively little swelling of the tonsils, but whitish patches of exudation are to be seen on tonsils, fauces, and pharynx. These patches sometimes look very like diphtheritic membrane and occasionally can even be stripped off, but in none of the cases has the specific organism of diphtheria been found. These throats tend soon to become dry, and are often associated with a red, bare, swollen, and dryish tongue. Curiously enough, the patients complain very little of any pain, and unless the fauces are very carefully examined the presence of the "sore-throat" is apt to be overlooked; the patients more often come before one as cases of gastro-enteritis or broncho-pneumonia than of tonsillitis. It is, I think, a very infectious illness, though often seen in much slighter forms in other members of the household.

Now I have seen a similar condition of throat in a number of the cases of encephalitis, and have pointed it out to my medical colleagues—sometimes even telling them beforehand that I expected to find it; but I think it has only been in those which I have seen in the early stages. I have also found symptoms of gastro-enteritis and broncho-pneumonia in these cases, and often albuminuria. I was particularly struck by its appearance in my women's ward at the Royal Salop Infirmary at a time when I had a typical case of encephalitis lethargica there. Two very well marked cases occurred; one was in a strong, healthy, hysterical girl who had been in for some weeks previously and who became very ill with it. The other was an elderly woman suffering from heart disease who had been in for many weeks and was at the time slowly recovering. She developed this illness and very nearly died from it. It was especially noteworthy that she made very little mention of any pain or soreness in the throat, though it was very markedly congested and unhealthy looking. We had a good many slighter cases of sore-throat in the ward. None of them showed any symptoms of encephalitis, but it was the fact that the patient with encephalitis had a similar condition of sore-throat when first admitted that made me suspect that she might have been the original source of the trouble.

Another case seen near Newtown, in Montgomeryshire, impressed me greatly. A country gentleman, aged 60, who led a very healthy, active life was suddenly smitten down after a day's hunting with a very severe illness, characterised by high fever, sore-throat, and intense headache, the pain being most severe behind the right eye. The glands of the neck were enlarged and tender; there was marked redness and slight swelling of the face, and a transient erythema on the body and limbs. The throat was a very marked example of the condition I have tried to describe, and showed the typical white patches of exudation. When I saw him he had broncho-pneumonia, with sharp crepitations at the bases; he also had gastro-enteritic symptoms, and his liver was palpable and slightly tender. He was certainly very acutely ill; but he was slowly beginning to show signs of improvement, when on the fifteenth day of his illness he had a rigor, the temperature ran up to 104° F., his face became ashy grey and sunken-looking, and his breathing became of the Cheyne-Stokes character. He became first drowsy, then more and more comatose, and he died three days later. This seemed to be a case of encephalitis lethargica in which the stress of the disease had fallen chiefly upon the medulla rather than upon the mid-brain or cerebrum, and it certainly began as a typical but very severe case of the illness which I have been trying to describe.

The theory which I wish to put forward is, therefore, that we have a very widespread disease in our midst, which is itself new in character, which is markedly infectious and therefore tends to be fairly common, and which occasionally attacks the higher nervous system and especially the mid-brain, producing the symptoms to which we have given the name of encephalitis lethargica. I think it is quite possible

that a far milder form of this disease is very common indeed, and that it is characterised by slight sore-throat and fever and some mild gastro-intestinal symptoms. Many of our nurses at the infirmary suffered from mild sore-throats at the time I spoke of, and sore-throats are not as a rule common amongst them; and if inquiries are made when a definite case of encephalitis occurs, one generally finds that others in the house, especially the children, have, or have had recently, slight colds or sore-throats.

I cannot pretend to have proved my theory, but I think it is right to put it forward for others to criticise and possibly either to confirm or to confute; and I do so feeling that in some ways a man who practises as I do as a consulting physician in a wide and somewhat thinly populated country district is in a better position for observing what one might term the natural history of diseases than those who practise chiefly in our large towns.

I am, Sir, yours faithfully,
H. WILLOUGHBY GARDNER, M.D., F.R.C.P.

Shrewsbury, Sept. 1st, 1921.

THE SWIMMING-BATH AND EAR INFECTION.

To the Editor of THE LANCET.

SIR,—In addition to the simple Eustachian catarrh described by Dr. K. Amersbach, of Freiburg, in your last issue (p. 519), workers in throat and ear clinics are only too well aware of the occurrence of the much more serious purulent otitis media as a consequence of bathing. So regularly does every warm summer bring cases of ear suppuration due to this cause to our notice that it would scarcely be an exaggeration to describe the incidence as an epidemic to which all bathers may be at some time or another exposed, and it is noteworthy and regrettable that the infection is quite frequently of a highly virulent type, as the serious sequelæ show. I have just had two cases of cerebellar abscess and lateral sinus thrombosis, both of which followed an acute middle-ear infection induced by bathing.

To suggest a method of preventing such accidents is rather difficult. On a hot summer day the refreshment of a cool dip is irresistible, and so people will only smile at the very slight risk of ear infection. Sufferers from chronic otorrhœa, however, should always be warned that bathing for them does entail a very serious risk indeed. On the other hand, a person with an old, dried-up perforation in the membrane is probably not any more prone to middle-ear infection than a normal subject, since it is almost certainly through the Eustachian tube and not through the external meatus that the infection reaches the middle ear in most cases. This raises the question whether the water is itself to blame for the infection, or whether it is not rather due to the washing-up of the patient's own nasal and naso-pharyngeal secretions into the middle ear in the same way as when that cavity is infected by the sniffling up of liquids into the nose for cleansing purposes.

Nevertheless, that pyogenic organisms are present in the water people are habitually bathing in cannot be denied, and every effort should be made to render and to keep such water as clean as possible. This, we must admit, must often be a difficult ideal to realise, but the matter is one for consideration by public health authorities.

Fresh water swimming-baths should be emptied and refilled with clean water not once but several times in the course of the day when there are many bathers, although this naturally necessitates a plentiful supply of water.

This precaution should also be adopted if possible at public sea-bathing establishments. There seems to be a popular notion prevalent that sea-water has the property of keeping itself pure and free from germs. This, of course, is an error. Wyatt Wingrave has often told me that he has always been able to grow the *B. coli communis* from the sea-water on the beach of any of our seaside resorts. And if this is true of water open to the sea, how much more contaminated must water be when it is enclosed in a public bath, where, between one full tide and another, crowds of bathers of all kinds are splashing about, adding each his own quota to the sum total of the bacterial flora.—I am, Sir, yours faithfully,

Wimpole-street, W., Sept. 3rd, 1921. DAN MCKENZIE.

A DISCLAIMER.

To the Editor of THE LANCET.

SIR,—I wish to disclaim any connexion with the publication of a paragraph in the *Daily Mail* of August 31st, in which my name occurs with reference to a case of Cæsarean section, and at the same time to protest against the exposure of such medical details in the lay press. On this occasion I am informed that a reporter visited the home in question and obtained such details as he required, in order to dish them up for the palate of the newspaper reader.

I am, Sir, yours faithfully,
BECKWITH WHITEHOUSE, M.S., F.R.C.S.,
Honorary Obstetric Surgeon, General Hospital, Birmingham.

Birmingham, Sept. 3rd, 1921.

LATE EFFECTS OF GASSING OR TUBERCULOSIS?

To the Editor of THE LANCET.

SIR,—Dr. J. B. Hawes's experience of the late effects of gas poisoning, the subject of an annotation last week, agrees with my own experience among tuberculous pensioners while tuberculosis officer for Carlisle. Patients suffering from the after-effects of gas poisoning do not show the usual constitutional symptoms associated with tuberculosis, but on the contrary are fairly well nourished. They complain of cough with a copious muco-purulent sputum in which repeated examination fails to reveal the tubercle bacillus. The chest is emphysematous in type, and in marked cases there is evident dyspnœa during rest, and sometimes asthmatical attacks occur at night. The physical signs which may be almost entirely confined to one lung consist of some impairment of the percussion note or definite dullness and faint breath sounds with prolonged expiration, accompanied by fine and coarse râles or rhonchi. The vocal resonance is also diminished. The condition remains practically unchanged under treatment. There is some amelioration during the summer, but the symptoms become aggravated during damp weather.

Such cases are referred by the Ministry of Pensions as tuberculosis, but I am of the opinion that the tubercle bacillus is in no way responsible for the condition which is one of chronic interstitial pneumonia. I am unable to state definitely the proportion of these cases, but I think I came across 5 among 70 pensioners referred to the tuberculosis dispensary.

I am, Sir, yours faithfully,

Eccles, Sept. 5th, 1921. J. E. SPENCE.

EARLY DIAGNOSIS IN DIPHTHERIA.

To the Editor of THE LANCET.

SIR,—In your issue of May 21st Dr. Frederic Thomson emphasised the great practical importance of early diagnosis in diphtheria, and two weeks later Dr. S. R. Collier related the steps taken by the Public Health Committee of Wimbledon to ensure to the practitioner a ready supply of antitoxin. It certainly seems useless for teachers and authorities like Dr. Thomson to instil into students the need for immediate antitoxin treatment on the diagnosis or justifiable suspicion of a case of diphtheria, if we, as practitioners, are to be hindered from carrying out such treatment by laymen on local district councils.

I am practising in a home county town not 35 miles from London, and some time ago I had a

suspicious case of diphtheria in a house in the poor industrial part of the town. I gave antitoxin, which the M.O.H. authorised me to purchase, and sent the bill in to the local council, which after discussion refused to pay, informing me that I must collect the money from the patient. The same week they refused to pay for antitoxin given by another practitioner for a similar case.

I give antitoxin for two purposes: (1) the benefit of the community, and (2) the benefit of the patient. If the local authority refuses to provide antitoxin, I endeavour to collect the cost from the patient; if I fail to do so, I then have to pay out of my own pocket for treatment which benefits the community. If this state of affairs is allowed to continue my dosage of antitoxin will depend on the length of the patient's purse or of my own. The suitability of patients for free antitoxin is surely a matter which must be left to the practitioners who enter the homes and know the circumstances of each case.

On placing the case before the Ministry of Health a letter was written to the council and elicited the reply, "that the case was one in which the council did not consider they should be called upon to provide antitoxin." The Ministry then informed me that they could do no more.—I am, Sir, yours faithfully,

August 28th, 1921. B. L. S.

THE GROSVENOR TELEPHONE EXCHANGE:

MEDICAL MEN'S NEW NUMBERS.

THE new Grosvenor exchange, opened on Sept. 3rd, at 39, South Audley-street, London, W. 1., involves the transfer of a number of medical subscribers from the Mayfair exchange. The new exchange lies within the 5-mile circle from Oxford Circus, and therefore within the local fee area of all exchanges within a radius of 10 miles from Oxford Circus. Arrangements have been made to transfer calls made for the old numbers with as little trouble and delay as possible, the callers being advised of the change in each case. We give a list of the names transferred from Mayfair to Grosvenor, and take the opportunity of adding a further list of intended transfers from Mayfair to Langham.

Transfers from Mayfair to Grosvenor. (Below the dividing line to take effect on Sept. 17th.)

Mayfair.	Subscriber.	Grosvenor	Mayfair.	Subscriber.	Grosvenor
65	Humphris, F. H.	2265	4880	Style, Mark	1629
210	Jennings, J. F.	1030	5117	Turner, Henry S.	1720
703	Brydone, J. M.	1733	5609	Shires, Bertram	1741
1125	Thomas, James H.	1125	5768	Hay, K. R.	1773
2076	Spitta, H. R. D.	2076			
2267	Blackett, E. J.	2267	964	Cautley, E.	1160
3099	Green, H. Melville	1230	1488	Griffith, A. D.	1488
3371	Rashleigh, J. C. S.	1240	2448	Moore, G. L.	2448
3455	Cobbledick, A. S.	1346	2995	Burroughes, H. N.	2995
3464	Wilson, C. M.	1350	4896	Armstrong, J. T. F.	1631
3608	Barnes, L. S.	1423	6389	Shields, Sir D. A.	2323
4620	Pratt, E. F.	1565	7136	Meyer, C. H. L.	2386

Transfers from Mayfair to Langham. (To take effect about Oct. 1st.)

Mayfair.	Subscriber.	Langham.	Mayfair.	Subscriber.	Langham
281	Mennell, J. B.	2827	4647	Bromley, Lancelot	2752
471	Milligan, E. T. C.	2828	6118	Lee, John Robert	2391
1633	Juler, F. A.	2689	6226	Ball, L. C. W.	1717
2440	Pennington, D.	2660	6508	Kadinsky, Z. S.	2394
2652	Hayton, C. H.	2693	6730	Jeremy, H. R.	2395
3684	Kelynack, T. N.	2713	7067	Scott, Eric A.	1337
4242	Fenwick, W. S.	2722	7081	Mandel, E. L. W.	1338
4460	Ferrier, Sir D.	2674			

These lists are inevitably incomplete, and we shall be glad to make any additions to which our attention is called.

Medical News.

FREE MILK IN INFANT WELFARE CENTRES.—The value of infant welfare centres has been considerably enhanced during the past few years by the supply of free milk to expectant mothers in the later months of pregnancy, to nursing mothers, and to artificially fed infants up to the age of 5 years. 50 per cent. of this expenditure has been met hitherto by a grant from the Ministry of Health. The decision to reduce this grant considerably is doubtless in response to the well-recognised need for economy in national expenditure. An adequate supply of milk is essential for expectant and nursing mothers and for artificially fed infants, and any measure that interferes with this supply is to be deplored. On the other hand, there is a possibility of abuse of this grant, and it is of the utmost importance that the milk should be granted only to deserving cases. It is to be hoped that by exercise of a vigorous scrutiny the welfare centres will be able to continue their valuable work, despite the proposed reduction in the State grant, and that at the same time the prospects of health of the next generation will not be impaired.

EPSOM COLLEGE.—Several exhibitions will shortly be awarded to the sons of such duly qualified medical men as shall in the opinion of the Council of the College be among the less fortunate members of their profession. Holders of these exhibitions pay only 50 guineas a year instead of the usual fee of 100 guineas. "France" pensions of £30 a year will also be awarded to several medical men not under 55 years of age, whose income, independently of any allowance from the College, does not exceed £100 a year. Forms of application can be obtained from the secretary Mr. J. Bernard Lamb, 49, Bedford-square, London, W.C. 1.

THE death is reported on Monday from Rhosneigr, Anglesey, of Thomas Arthur Helme, M.D., F.R.S. Edin., M.R.C.P. Lond., consulting physician to the Northern Hospital for Women and Children, Manchester.

THE LATE DR. R. W. ALLEN.—Richard William Allen, M.D., B.S. Lond., who died on August 28th, was a native of Auckland and graduated M.A. New Zealand from Auckland College. He then had a distinguished academic career at Guy's Hospital. Formerly pathologist to the Royal Eye Hospital he became interested from the first in vaccine therapy, directing this department at Mount Vernon Hospital, and editing for a time the *Journal of Vaccine Therapy*. His book on Vaccine Therapy: its Theory and Practice, ran into four editions, and he was the author of a larger work on the Bacterial Diseases of Respiration.

THE LATE DR. A. J. MACCALLUM.—Alexander John MacCallum, who died in a nursing home at Aberdeen on August 23rd, was a native of Keith, Banffshire, and took his degrees of M.B., C.M. at Edinburgh in 1891, becoming F.R.C.S. Edin. in 1902 and M.D. in 1908. He practised at Kendal, and was particularly interested in epilepsy, being for some years physician to the Staruthwaite Epileptic Colony. A magistrate for Kendal, and for some time a County Councillor, Dr. MacCallum had many interests outside his busy professional life, and his death at the early age of 54 removes a figure well known throughout Westmorland.

THE LATE DR. ALFRED MACPHERSON.—Dr. Alfred Macpherson, the oldest practitioner of Uitenhage, Cape Province, died there on August 4th, after an illness of three months. He was one of the leading men of the district, having taken an active interest in educational, political, and other public matters. Dr. Macpherson, though he had refused all invitations to stand for election to the House of Legislative Assembly, was the leader of the local branch of the Unionist Party (now amalgamated with General Smuts's South African Party). Dr. Macpherson was educated at the University of Edinburgh, where he graduated M.B., C.M. in 1880. He leaves a widow, one son, and three daughters.

THE LATE DR. T. H. MORTON.—Thomas Henry Morton, who died at his home at Nether Edge, Sheffield, on August 26th, in his 83rd year, was the doyen of the medical profession in the city. He became M.R.C.S. Eng. in 1861, L.S.A. in 1862, L.R.C.P. Irel. in 1874, and M.D., C.M. Aberd. in 1876. At one time President of the Sheffield Medico-Chirurgical Society he practised in Sheffield throughout his professional life, and was held in great esteem by the workpeople. Although he had retired from practice for many years Dr. Morton remained a well-known figure on account of his wide interests, which included furniture, archæology, numismatics, ornithology, and photography; he was also keenly interested in politics and active in Church affairs.

PORTLAND convict prison has been converted into a Borstal Institution, making the fifth institution of the kind in England.

THE late Sir George Henry Savage left his books on insanity to the Bethlem Hospital, and his collection of minerals to the Natural History Museum, South Kensington.

THE George Henry Lewes studentship in physiology, value £245 a year and tenable for one to three years, will shortly be vacant. Application to Prof. Langley, at the Physiology School, Cambridge.

WIGAN INFIRMARY.—During the 13 weeks of the coal strike the Wigan Infirmary lost more than £3000 by the lapsing of the weekly subscriptions which the miners voluntarily contribute to the maintenance fund of the hospital. A "special effort week" is being organised in the town with the object of wiping out the temporary loss of subscriptions.

PRESENTATION TO A MEDICAL MAN.—On the occasion of his resignation from the position of surgeon in charge of the Glasgow Orthopædic Institute, Dr. William Laird has received a presentation of silver plate. As many as 14,000 cases of disabled soldiers have passed through Dr. Laird's hands since the opening of the Institute. He proposes to devote himself to private practice.

THE Manchester Corporation have made grants amounting to £6000 to local hospitals, including £1500 to the Royal Infirmary and £1200 to Ancoats Hospital. The corporation have received Government grants for tuberculosis treatment £17,550, for maternity and child welfare work £13,500, and for treatment of venereal diseases £4161, in respect of estimated expenditure for the half year ending Sept. 30th.

DRUGS NEEDED IN RUSSIA.—A cablegram received from the Russian Committee of the Friends' Relief Committee (27, Chancery-lane, London, W.C. 2) states that there is urgent need in the famine area for the following drugs—namely, atropine sulphate, caffeine, iodine, ipecacuanha root, neosalvarsan, potassium iodide, and pilocarpine hydrochloride. These drugs can be put to good use if placed at the disposal of the Committee.

VISIT OF SWISS MEDICAL STUDENTS TO VIENNA.—On Oct. 7th about 100 medical students accompanied by the professors from a number of Swiss clinics will pay a visit of inspection to hospitals and clinics in Vienna. Special courses lasting a fortnight are being arranged. The visit was proposed by Prof. von Eiselsberg (surgery) of Vienna to his old assistant, Dr. P. Clairmont, now professor of clinical surgery at Zurich, on a visit paid by the former to Switzerland in July.

WINSLEY SANATORIUM.—On August 31st a large number of representatives of Bristol and Bath Corporations and of the Wiltshire County Council visited the sanatorium at the invitation of the executive committee of the institution. During an informal gathering which followed inspection of the grounds, various speakers expressed their sense of the excellent work now being carried on there, and paid tribute to the pioneer efforts of Dr. Lionel Weatherly, whose labours were largely instrumental in the foundation of the sanatorium in 1903, and who became the first chairman of the managing committee when the buildings were opened in the following year.

THE LANCET: SUBSCRIPTION RATES.

INLAND	One Year	£2	2	0
	Six Months	1	1	0
	Three Months	0	10	6
ABROAD	One Year	£2	10	0
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Medical Diary.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.

MONDAY, Sept. 12th.—2 P.M., Dr. S. Pinchin: Medical Out-patients. Dr. Simson: Diseases of Women. 2.30 P.M., Mr. T. Gray: Visit to Surgical Wards.

TUESDAY.—10 A.M., Mr. Steadman: Dental Department. 2 P.M., Dr. Burrell: Medical Out-patients. Mr. Simmonds: Surgical Out-patients. 2.30 P.M., Mr. T. Gray: Operations. Mr. Addison: Visit to Surgical Wards.

WEDNESDAY.—2 P.M., Dr. Owen: Medical Out-patients. Mr. Addison: Operations. Mr. D. Armour: Visit to Surgical Wards. Dr. Burnford: Visit to Medical Wards.

THURSDAY.—2 P.M., Mr. B. Harman: Eye Department. Mr. D. Armour: Operations. Mr. Simmonds: Orthopædic Department.

FRIDAY.—10 A.M., Mr. D. Buxton: Dental Department. 2.30 P.M., Dr. Pritchard: Visit to Medical Wards.

SATURDAY.—10 A.M., Dr. Paterson: Medical Diseases of Children. 2 P.M., Mr. Sinclair: Surgical Out-patients.

Daily:—10 A.M., Visit of Post-Graduates to Wards. 2 P.M., In-patient, Out-patient Clinics and Operations.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Wednesday morning of each week, such information for gratuitous publication.*

SOWDEN, G., M.D.Brux., M.R.C.S., L.R.C.P.Lond., D.P.H.Camb., has been appointed Medical Officer to the Post Office for the North-Western District, London.

Manchester Royal Infirmary: J. G. HISLOP, M.B., Ch.B.Aus., R. WILLIAMSON, M.B., Ch.B.Vict., and J. W. FORD, M.B., Ch.B.Syd., House Physicians; A. W. HARLEY, M.B., Ch.B.Aus., Senior House Surgeon: A. H. SOUTHAM, F.R.C.S. Eng., Surgical Registrar: JOHN GOW, F.R.C.S.Eng., Assistant Surgical Officer; MARGARET DOBBIE, M.B., Ch.B.Edin., Medical Officer, Central Branch: ELIZABETH FORBES, M.B., Ch.B.Edin., Assistant Medical Officer, Central Branch.

Certifying Surgeon under the Factory and Workshop Acts: MULHOLLAND, H. C., M.B., B.Ch. N.U.I., for District of Swinton.

Vacancies.

For further information refer to the advertisement columns.

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The Chief Inspector of Factories, Home Office, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at: Hoo (Kent); Knottingley (York, West Riding); Preston, West (Lancs.); Stevenage (Hertford); Catrine (Ayr); Carnoustie (Forfar).

The Home Secretary gives notice of a vacancy for a Medical Referee under the Workmen's Compensation Act, 1906, for the Sheriffdom of Forfar. Applications for the post should be addressed to the Private Secretary, Scottish Office, Whitehall, S.W. 1, and should reach him not later than Oct. 1st.

Births, Marriages, and Deaths.

BIRTHS.

BETT.—On August 23rd, at Haslar, the wife of Surgeon Rear-Admiral William Bett, M.V.O., R.N., of a son.
CAPLAN.—On August 28th, at North End-road, West Kensington, the wife of Samuel Caplan, M.D., of a daughter.
FOULKES.—On August 29th, at Nelson-street, King's Lynn, the wife of Peter Gifford Foulkes, M.B., B.S. Lond., of a son.
HAWARD.—On Sept. 2nd, at the Wold, Woldingham, Surrey, the wife of Walter Haward, M.B.Durh., B.S., of a son.
HEFFERMAN.—On August 29th, at Namtu, Burma, the wife of L. W. Hefferman, M.R.C.S., L.R.C.P. (Joan Godfrey), of a daughter (Pamela Dorothy). (By cable.)
HOSKIN.—On August 29th, at Sheffield-terrace, Campden Hill, W., the wife of T. Jenner Hoskin, B.Ch.Camb., M.R.C.P.Lond., of a daughter.
MONTGOMERY.—On August 24th, at Beaumont-street, W., the wife of V. C. Montgomery, M.B., Ch.B.Belf., of a son.
PERN.—On August 28th, at Hildegarde House, Whitby, the wife of L. Pern, M.R.C.S., L.R.C.P.Lond., of a son.
PURCHASE.—On August 29th, at Warwick Mansions, S.W., the wife of Dr. W. Bentley Purchase, Barrister-at-law, of a daughter.

MARRIAGES.

FRANKLIN—WEIR.—On Sept. 1st, at St. Columba's (Church of Scotland), Pont-street, the Rev. Foster Franklin, M.A., Minister of the Parish of Kimlacolm, Renfrewshire, to Mary MacLean Weir, M.A., M.B., Ch.B. Glasg., daughter of Mr. and Mrs. John Weir, Catford.
GREVILLE—MOWAT.—On Sept. 3rd, at St. Andrew's Church, Frognal, Gordon Greville, M.R.C.S. Eng., L.R.C.P. Lond., to Marjorie Scott, daughter of the late Robert Mowat and Mrs. Mowat, Edinburgh.
MACKIE—COLLINGWOOD.—On Sept. 1st, at Yateley Church, George Mackie, D.S.O., T.D., M.B. Edin., to May Campbell Carnegie Collingwood.
WALLIS—ROFFEY.—On Sept. 1st, at St. Swithin's Church, East Grinstead, William Evershed Wallis, M.B., B.C. Camb., only son of Dr. W. Wallis, Groombridge, to Eileen Mary Constance, only daughter of Sir Walter and Lady Roffey, Thornhill, East Grinstead.

DEATHS.

ALLEN.—On August 28th, at Harley-street, London, W., Richard William Allen, M.D., B.S. Lond.
DAVIES.—On August 30th, after an operation, Hughes Reid Davies, M.R.C.S. Eng., L.R.C.P. Lond., of Gildredge House, The Goffs, Eastbourne, aged 62 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Short Comments, and Answers to Correspondents.

THE PART PLAYED BY THE ENDOCRINE GLANDS IN THE EVOLUTION OF MAN.[1]

BY PROFESSOR L. BOLK,
DIRECTOR OF THE DEPARTMENT OF ANATOMY IN THE UNIVERSITY OF AMSTERDAM AND SECRETARY OF THE ROYAL ACADEMY OF SCIENCES.

THE invitation of the London University to deliver a lecture was accepted by me with great pleasure. By accepting it I intend to express my full approval of the aims of the Anglo-Batavian Society. The English and the Dutch have many psychical and physical characters in common. This resemblance is rooted in the identity of the racial composition of the population of both countries. As I have investigated the anthropology of my people during many years, it would have given me much pleasure to describe this resemblance to you in detail. Attractive as a lecture on this subject would have been, however, this evening I will direct your kind attention to another theme. The desire was almost irresistible to lecture in the country of Darwin, Huxley and Wallace, on the "Evolution of Man." This subject was chosen by me because I believe I shall be able to throw some new light upon this problem of problems.

I intend to describe to you human evolution as the effect of the agency of the endocrine organs. Now, I am aware that this theme is not quite new. The country, one of whose most famous poets—writing at a time when Darwin was still in his boyhood—once said: "And I am born where men are proud to be"—this country in later times also has brought forth biologists of uncommon intellectual power who, by their investigations, have added considerably to our knowledge of the evolution of man. I fear it would be too severe a strain upon the modesty of my colleagues, Prof. Elliot Smith and Prof. A. Keith, if I undertook to sketch their merits with regard to the deepening of our insight into the historical development of man. But in drawing your attention to the most recent publication of Prof. Keith, concerning the relation between evolution and the endocrine system, it will become clear to you that the side from which I approach this problem is not in all respects a new one. The time at my disposal is short, and I am obliged to treat my subject in a very condensed manner. I shall begin with a summary.

Functions of the Endocrine Organs.

It is certainly superfluous to enter into details as to the function of the endocrine organs. It is generally known that the secretions of these organs are in some obscure way correlated with the general condition of the organism. And it may be sufficient to mention that by this secretion the metabolism of the organism is regulated. This function being of a purely physiological nature will not be discussed in the present lecture. A second function of these organs, which undoubtedly stands in close relation to the one just mentioned, is of greater interest to the morphologist. The endocrine organs control the harmonic development of the body, they are the sources of the directing factors of morphogenesis. The different parts of the body do not develop in an autonomic way, independent of each other, but during development they stand in continuous interrelation. The maintaining of this correlation is that function of the endocrine system which I call their architectonic function. By virtue of this function they are the controlling factors of the development of the body; each morphological feature is subject to their influence. Thus it is clear that these organs are of the utmost significance for the ontogenesis of man. The question, however, which will be treated on in the present lecture, concerns their significance for phylogenesis, the historical evolution of the human body. And I intend to demonstrate to you that the endocrine organs have to a very large extent controlled this evolution also.

It may be accepted a priori that some interrelation must exist between phylogenetic development and the function of these organs. For in human individuals of

[1] A lecture delivered at the Royal Society of Medicine on May 12th, 1921, under a scheme for the exchange of Lecturers in Medicine between England and Holland arranged by the Anglo-Batavian Society in coöperation with the Royal Academy of Sciences in Holland and the University of London.

to-day the effect of their function is the development of a human body as it actually exists. But in earlier times, in the ancestor of man, there was built up under their influence a form different from the present, a form with more primitive, ape-like characters. So it follows that, if the endocrine organs control the development of the body, they must modify their function in accordance with the modifications in the structure or features of this body during the course of time. This fact gives rise to the following question of fundamental importance: What is the nature of the correlation between the morphological modifications of the organism and the changes in the function of the endocrine glands? There are two possibilities: either the endocrine organs have adopted their function to the modifications of the body, or the latter are the consequence of a primary alteration in the function of the glands. To determine which of these possibilities is the true one is of the utmost importance, for this decision determines our standpoint as to the more fundamental question whether evolution is the result of external factors only, or of those in conjunction with internal ones. This problem forms the general biological foundation of my lecture.

Results of their Suppressive Agency.

The somatic differences between a primitive form and its more differentiated descendant are of a regressive or of a progressive nature. In the first case some anatomical character of the ancestor is absent or not so strongly developed in the descendant—in other words, the potentiality for development of this character is suppressed or weakened in the course of phylogenesis, and the agency of the endocrine system in this case was a suppressive one. In the second case an anatomical character is more strongly developed in the descendant; the agency of the endocrine glands has, in this case, been a stimulating one. Now I intend to make clear to you that nearly all essential human characters are the result of a suppressive agency of the endocrine organs. How, you will ask, have you arrived at this conclusion? By two ways: that of embryology and that of pathology. Embryological and pathological phenomena, in combination with each other, throw a very interesting light upon the important influence which the endocrine organs have exercised on the evolution of the human body, as I will demonstrate to you. I believe it will be of great use to summarise beforehand the essentials of my lecture. I shall give this summary in the form of the following six conclusions:—

1. The essential characters of the human body are a survival of fœtal conditions. 2. This persistence of fœtal conditions is the result of a retardation or a suppression of the development of certain general characters of Primates. 3. This retardation or suppression is caused by the agency of the endocrine organs. 4. In morbid affections of the endocrine organs this suppressing agency is removed, and the human body once more acquires features of some ape-like ancestor. 5. The retardation of development concerns not only purely somatic features, but human development as a whole. The developmental rate of man is retarded, the succeeding phases of his life are protracted. 6. This retardation of the developmental rate of man is, perhaps, caused by the change of the nature of his food, the frugivorous ancestor of man becoming omnivorous or carnivorous.

Hairlessness of the Human Body.

These conclusions, which are so many chapters of a theory of the evolution of man, are not speculative, but are founded, as you will see, upon well-known embryological facts and pathological observations, with exception of the last of the series, which is merely a suggestion or presumption. The fourth conclusion implies that diseases of the endocrine organs influence in the first place the essential human characters. Now, the number of these is very small, and I shall begin by discussing one of the simplest—namely, the hairlessness of the human body. Many opinions as to the cause of the nakedness of the human skin have been advanced in literature already: natural selection, sexual selection, climatological influences, and so on. I refrain from criticising these ideas, but draw attention to the fact that nakedness of the skin is a common fœtal character. In the embryos of all Primates the hair appears rather late, the development of the hairy covering in this order of vertebrates seems to be generally retarded. This retardation is the initial phase of the process which resulted in the complete loss of the hairy covering in man, with the exception of the scalp. It is maintained that the presence of hair here is due to sexual selection. This assertion cannot be true, as I will demonstrate to you. In the skin of a nearly full-grown fœtus of a chimpanzee the pigmentation is yet wanting, a remarkable fact to which I shall return. But most remarkable is the hairlessness of nearly the whole body; only the scalp bears long brownish hair. This valuable specimen proves that the mode of distribution of hair on the surface of the human body is found already in principle in the anthropoids, and that therefore the agency which caused the nakedness of the human body is already active in anthropoids. Could you wish for more conclusive proof that this nakedness cannot be the result of natural or sexual selection, but is acquired by the influence of an internal factor, which suppressed almost completely the development of the hairy covering of the body and perpetuated a fœtal condition?

Now the question arises, what endocrine organ suppressed the development of the hairy covering of the human body? Some very suggestive pathological observations serve as a valuable clue. It is a well-known fact that affections of the pituitary body can influence the state of hairiness in a high degree. This influence does not always bear the same character, but, for the point under discussion, it suffices to recall to mind that it is demonstrated in some patients by the development of a dense hairiness specially all over the limbs and trunk. I am inclined to believe that in those persons the suppressive influence exercised by the hormones of the pituitary body is eliminated, so that the latent potentiality for hair-forming becomes active again.

White Skin of Some Human Races.

We shall now consider a second essential human character—namely, the white skin of man. Though this be only a racial character I will discuss it now, because it affords me the opportunity of demonstrating the significance of the endocrine organs with regard to racial differences. For it is obvious that if these organs have influenced the evolution of man as a species, the same holds true also, in no mean degree, as to the differentiation of this species into its races. The skin of all Primates is coloured by black or brown pigment, and in man some races agree in this respect with the apes, but a considerable part of man has a white or somewhat yellowish coloured skin. Many opinions have been advanced as to the means by which man got his uncoloured skin. None of these will be advocated here, because I shall throw light upon this phenomenon from my own standpoint.

It need scarcely be observed that of all Primates the fœtus passes a stage during which its skin, as well as its iris are free of all pigment. White skin and blue iris are, therefore, properties of the primate-embryo in general. But before birth the skin and iris of the ape-fœtus become coloured. In man in some races these fœtal qualities—pale skin and blue eyes—have become perpetuated—that is to say, the potentiality to form pigment in the deeper layer of the skin is suppressed. In other races, on the contrary, this potentiality is preserved; skin and iris become intensely coloured. But, as will not be unknown to you, this pigmentation of the skin happens after birth; the negro-babe is born with a somewhat greyish or yellowish coloured skin. It seems as if the internal factor, which suppresses the formation of pigment in the skin of white races, exercises its influence already in the black races, where the process of colouring is retarded.

Allow me in this connexion to draw your attention to a parallelism between two facts? The developmental factor causing the nakedness of man was already active in anthropoids, as shown in the fœtal chimpanzee with naked trunk, limbs, and face, and head covered with long hair, quite like a human baby. This is the first fact. And as to the pigmentation of the skin we have seen that the developmental factor, by the agency of which a part of the human species became pale-skinned, is active already in the other part; the negro-babe is white-skinned. This is the second fact. My conclusion from these relations is quite simple. By the preservation of his naked skin man occupies a higher level in the developmental scale than the other Primates; so by the permanence of the unpigmented skin the white race occupies a higher level than the black races. The race with white skin and blue eyes—the Nordic race—is a more progressive form of man than the black-skinned races. It is, so to say, the most fœtal of human varieties. Can it be possible that this assertion affords a key to the solution of the problem why also in other respects the negro is inferior to the white? As you see, my point of view perhaps opens some new perspective for the understanding of the inequality of human races.

After this digression we return to the matter in question. We have demonstrated that the paleness of the skin of the white races is due to the suppression of a developmental potentiality present in all Primates—namely, the formation of pigment.

And again we put the question: Which of the endocrine organs must be considered as the starting-point of this phenomenon? This question calls up in my mind the name of one of your countryman, Addison. It is superfluous to summarise the symptoms of the disease named after this renowned physician. Passing over the general constitutional symptoms, consider for a moment the most characteristic phenomenon of this disease—the

pigmentation of the skin. You know that the cause of Addison's disease is an affection of the suprarenal body. And so the following facts may be stated. An affection of an endocrine organ causes a reappearance of the pigment in the skin of white man—that is to say, that an essential human character is lost by this affection, the individual reacquires a quality of one of his ancestors. And so it seems to me to be not a daring conclusion that the loss of pigment during the course of evolution was due to the suppressing influence of the suprarenal body. As soon as this organ is affected its normal function is modified, the check is removed which hinders the formation of pigment in the skin, and it becomes coloured again.

Orthognathy of Man.

I pass on to another human character. Man differs from the other Primates in a typical way by his orthognathous skull. In the nearest relatives of man, the anthropoids, the facial part of the skull is strongly developed, the massive jawbones predominate over the braincase, and the brow ridges overhang the orbits like penthouses. The anthropoids have a small facial angle. In man, on the contrary, the facial part of the skull is of slighter development, the jawbones are scarcely prominent, the brow prominences project but little, and the facial angle is a large one. Now, in judging the human form, I lay stress upon the fact that orthognathy is a fœtal character of all Primates. It is only during the second half of ontogeny that the facial part of the skull begins to project strongly. In man the embryonic condition persists, the development of the jawbones is a very slight one. Therefore the orthognathy of man must also be considered as the consequence of the suppression of a developmental potentiality. This suppression does not act equally strongly in all human races. And again, in the black races in general and the Australian natives in particular, the prominence of the jaws becomes least suppressed. As regards this characteristic also the white race, judged from my standpoint, is the most human.

Is there any indication of the endocrine gland by the agency of which the orthognathy of man may have come about? Certainly. For though the strong development of the jaws, especially in the white races, is suppressed, its developmental potentiality is not annihilated; it has become latent. There are known to all of you cases in which, in some individual, the jaws recommence to grow in an anomalous manner, and the brow prominences begin to project, this being one of the main symptoms of acromegaly, well recognised as a disease of the hypophysis. It seems as if in these cases the hormones of this endocrine gland act insufficiently and the latent potentiality reasserts its power. This occurrence is comparable to that in which the higher psychical functions of man are abolished, and the brutal instincts which are normally inhibited reacquire control of his actions.

The affection of the hypophysis causes yet another phenomenon in accord with the principle of my theory. In comparing the hand and foot of man with those of anthropoids, striking differences, specially of the foot, may be noticed. In anthropoids, as you know, the terminal part of the hind limb is hand-shaped. Again, I want to emphasise the fact that in its outer form the foot of man has retained its fœtal feature; the hand-like foot of the anthropoids is the differentiated form. So also in the outer form of man's foot an embryonic condition persists. But it is not only to this point that I wish to draw your attention. The anthropoid hands are clumsy and heavy, those of man slender and modelled after a more elegant pattern. And if I had sufficient time to do so I could prove to you that also the hand of man is of a more fœtal form than that of apes. Now I remind you of the fact that another acromegalic symptom is the enlargement and increasing clumsiness of hands and feet in man. It seems, therefore, that like his jaws the terminal parts of his limbs are freed from a suppressive influence in man; his pituitary body is affected, and a lost ape-like condition returns.

Closing of the Cranial Sutures.

The next essential characteristic of man which I shall discuss is of a more histological nature. As a rule the sutures of the skull close very early in apes, and there is a great tendency for them to unite in childhood. Some years ago I published a thorough investigation of this phenomenon, and demonstrated that, for instance in gorilla and orang, the sutures in the vault of the skull, as a rule, have disappeared before the spheno-occipital synchondrosis is closed. In man, on the contrary, the synostosis of the cranial bones is postponed to a very much later period than in anthropoids and the disappearance of the sutures seems to be more a symptom of senescence.

The sutures of the skull are the lines along which the enlargement of the cranial bones takes place, and this enlargement is requisite as long as the brain-case increases in size. The function of the sutures is terminated, therefore, as soon as the brain has attained its adult proportions, after which they can close without harm. This happens in all other Primates. The persistence of the sutures in man long after the brain is full-grown is again to be considered as the continuation of a fœtal condition; and like the other characteristics already mentioned, the persistence of the sutures also results from a retardation or suppression of a growth process—namely, the ossification of the fibrous tissue between adjacent bones. This retardation in the closure of sutures exhibits itself in yet another way—namely, the occasional permanence of the interfrontal suture. As a rule this suture is closed in man in early childhood, as it does also in anthropoids, whilst in lower Primates the frontal bones have become fused together even before birth. In a certain percentage of men, the interfrontal suture does not close—a phenomenon which is distinguished as "metopism." In an investigation published some time ago, I demonstrated that metopism is not at all due to increased intracranial pressure, caused by exceptional enlargement of the brain, as is asserted by some authors. Metopism is nothing but the result of the same process by which the sutures in man generally tend to persist.

Metopism is certainly one of the last acquired somatic human characters, and it is very remarkable also that this character is found more frequently in white men than in black races, and, further, that among the former it occurs most frequently in the Norvic race. In the latter it is found on an average of 8 or 9 per cent. Thus the race which is distinguished by the absence of pigment, by the high degree of prognathism, and also with regard to metopism, is found in the highest level of human evolution. Is there any indication as to the endocrine organ by the agency of which the ossification of the sutures in the skull was retarded? Certainly. And this indication is afforded again by pathological observations. It is more than a probability that this organ was the thymus, for the osteogenetic processes are regulated by this gland. This is not a mere supposition, for we know that extirpation of this organ in young individuals or destruction of the same by some affection causes a disorder in the normal osteogenesis. This disorder is recognised by the rachitic changes in the tissue of the bones. Now it is a matter of fact that one of the symptoms of a rachitic constitution is the premature and irregular closure of the sutures of the skull. Therefore we conclude that, since normal function of the thymus prevents premature closure of the sutures, the regular ossification of the sutures, and the time at which this process takes place depends on the agency of this gland.

Labia Majora and Hymen in the Human Female.

I will now proceed to discuss another essential somatic characteristic of man which also is a perpetuated fœtal feature, but of a nature quite different from the foregoing. Females of the human species differ from those of the other Primates by the possession of labia majora and of a hymen. I shall not discuss this latter formation, its ontogenesis being as yet a subject of much controversy. I lay special stress upon this difference between man and apes, because it is an anatomical characteristic, for which it cannot be claimed that its development was of any value to the individual in the struggle for life, or may have been acquired by the influence of some external factor. Many years ago this difference between man and apes was the subject of an attack made by Bischoff, the Munich anatomist, on the Darwinian doctrine. He maintained that the complete absence of labia majora proved conclusively that there was no relationship between man and the apes. Now Bischoff overrated the value of this argument, because he committed the mistake of examining only adult specimens. If he had extended his researches to fœtal material he would have destroyed the foundation of his argument against Darwinism. For—and this is an essential point for the present discussion—in the embryo and fœtus of other Primates there are also during a shorter or longer period a mons veneris and labia majora. As you know, the labia majora, together with the mons veneris, are differentiated from the outer genital folds. Now these folds appear in apes as in man. But whilst in apes as a rule they are flattened and disappear completely, in man, on the contrary, they increase; their ventral part surrounds and covers the genital papilla, or clitoris, so that this organ comes to lie deeper, whilst in apes it remains at the surface. The lateral parts of the external genital folds increase also, and form the labia. So the special structure of the external genitals in women is a persistent fœtal character.

Now it is very interesting that in anthropoids the tendency to this perpetuation is present. For in anthropoids the flattening of the outer genital fold is not as complete as in lower Primates. So in his monograph on the chimpanzee, Sperino remarks that on both sides of the entrance of the vestibule there is a slight prominence, caused by a thickening of subcutaneous fat; and there is also an indication of a mons veneris. Quite the same condition is noted by Deniker in

the gorilla. He writes verbatim as follows: "In accordance with my description the labia majora exist in the fœtus of the gorilla and the nymphæ are very like those of the human fœtus. These facts are in contradiction with the assertion of Bischoff." The same holds good for the orang, for this ape also possesses rudimentary labia majora. Thus we see that the disappearance of the outer genital fold is already incomplete in anthropoids. It seems as if the course of morphological evolution which resulted in the human form of external genital organs, made its first progress in anthropoids, for the retarded flattening of this fold in apes may be regarded as a transitory stage to the persistence of the same in man. Now in man the individual variability of the labia majora is considerable. I do not know if this variability forms a difference between black and white races. The collection of the anatomical museum of the Amsterdam University contains only two examples of external genital organs of female negroes. Both are characterised by large labia minora and very scanty development of the labia majora. This is in accordance with what I expected to find, but if my observation be an exception or the rule, I cannot say.

Is it possible to ascertain what endocrine organ has effected the perpetuation of this fœtal condition in man? I think so. In some instances one observes an ape-like condition—that is, a very scanty development of the outer genital organs—in individuals of the white race. These pathological conditions again furnish a hint as to the endocrine organ by which the growth of the labia majora is regulated. This gland is the thyroid. I shall confine myself to enumerate only two facts in favour of this view. The first fact is that after extirpation of the thyroid the labia majora commence to atrophy, and the second, that atrophic or infantile female outer genitals begin to develop more strongly after injection of thyroidine. These facts justify my assertion that the development of the labia majora and mons veneris as an essential human character was due to the agency of the thyroid gland.

Position of the Occipital Foramen.

Now there still remains a group of essential human characters of which it is easy to demonstrate that they are persisting fœtal conditions. For the sake of conciseness, however, I must confine myself to a simple enumeration and some brief remarks on these features, because I prefer to give you a somewhat complete survey of my theory of human evolution; and such a survey requires also an explanation of the fifth and sixth conclusion previously mentioned. One of the most characteristic features of the human skull is the central position of the occipital foramen. It is a rather common opinion that during the evolution of man this foramen is shifted forward, because in apes it occupies a more backward position. As the result of an extensive investigation I have come to a different conclusion. In the fœtus of all Primates the occipital foramen occupies during a shorter or longer phase a central position, as in man. In man this primitive position is fixed, whilst in the other Primates the foramen shifts backward. Therefore there is no question of a shifting forward in man, but the shifting backward, normally occurring in Primates, is inhibited in man. It is, however, very interesting that this displacement occurs also in man to a small extent between the seventh and twelfth year. Thus also the structure of the base of the human cranium appears as a persistent fœtal condition, like its prognathism and the high vaulting of its roof. As a further special human character I mention the shape of the pelvis, which is very primitive. In vain you will try to find in the human fœtus a transitory stage of this part of the skeleton similar in form to the pelvis of lower Primates. The broad, short iliac bone is characteristic of an early stage of development. In man this stage is fixed; in anthropoids the beginning of this process is seen; in lower Primates it is transformed into the long, narrow bone common to many mammals.

Structure of Aortic Arch and Kidneys: Weight of the Brain.

I will give further instances. The arrangement of the branches of the human aortic arch differs from that of apes. Now the manner of branching in man represents an earlier embryonic stage than that in apes. And to put it briefly, the same may be remarked with regard to the difference in the structure of the kidneys. Man possesses kidneys with a greater number of papillæ, a primitive condition; the other Primates, with exception of the American monkey Ateles, have kidneys with a single papilla. I regret that want of time prevents me from a discussion on these points, and also from a debate on the principal difference between man and apes—namely, the considerable weight of his brain. With a very conceivable scepticism you might ask me if this characteristic is also the result of an inhibition in the morphogenesis of man? It may sound paradoxical, but I answer this question in the affirmative. The considerable weight of the human brain is the result of the fixation of an early developmental relation between this organ and the body as a whole. In apes this relation is fixed in a more advanced stage of development, in which the weight of the brain has already become relatively smaller. The earlier the relation between brain and body is fixed, the larger the volume of this organ becomes. Viewed from this standpoint the considerable weight of the human brain appears to us as dependent on the function of the endocrine system. In the masculine sex the relation is fixed somewhat earlier than in the female; in the microcephalic idiot the relation is fixed too late. I restrict myself in giving you only the main line of my opinion as to the origin of the large volume of the human brain. The treatment of this subject would require a special lecture, and is surely worthy of one.

Retardation of Germinal Development in Man.

In the foregoing I have given the principal arguments in favour of my assertion that each somatic characteristic of man is the result of a retardation or an arrest of a definite part of the developmental process. So the human body in its actual state gradually evolved by the successive loss of somatic features of the pithecoid ancestor. I cannot mention a single essential human character which is a new acquirement—an addition. Only the high differentiation of the facial and laryngeal muscles in man may be considered as such a really progressive feature, but this progression was a consequence brought about by his psychical evolution. Now I am convinced that this arrest or suppression of the development of somatic characters is the expression of a more general process—namely, the retardation of the vital process of man as a whole. The rate of development in man is retarded with the consequence that the infantile and puerile phases of his life are prolonged, the duration of man's life is extended. This general retardation concerns the somatic as well as the germinal part of his organism. For the sake of conciseness I restrict myself again to some remarks regarding the retardation of his germinal development. The generative glands of women have the very curious peculiarity that there is an interval of 10 to 15 years between the completion of the histological differentiation and the commencement of the physiological function of the organ. As far as I am aware this phenomenon is met with only in the genus Homo. The possibility, however, that there are other mammals—specially among those of larger dimensions—in which the same takes place is not to be denied. But it certainly is not a rule. As a rule the genital glands in mammals behave like other organs; function begins as soon as the histological differentiation is completed. The condition as found in man is not a primitive one. At the end of the second year the human ovary contains its final number of germ cells. There is no further increase. There follows a rather long period during which the ovary remains in a state of latency, as if it were dead, though living. This condition lasts till the development of the somatic part of the organism has progressed far enough to undergo the consequences of the function of the germinal part—that is, conception and pregnancy. This period of latency of the genital glands, this prolonged state of childhood in man, must have been intercalated during man's evolution, and can only be explained by an arrest of the vital process, by a retardation of his development.

And this very particular biological phenomenon, this alteration of the utmost importance in the vital process of mankind, has perhaps been the mightiest cause of the evolution of man as a social being. For by this retarded development the awakening to consciousness of man is delayed till long after birth, the time of life in which the human individual is able to support himself; when he can begin his struggle for life is delayed till a rather remote epoch. During this protracted childhood, he remains dependent on his parents, forming with them a biological community, a family in its most primitive form. And the family is the element of society.

Inequality of the Sexes.

But not only the evolution of man as a social being is rooted in this arrest of his development, but in my opinion the undeniable inequality of the two sexes (with the superiority of the masculine) has taken its starting-point from this arrest. If retardation of the developmental processes be the fundament of human evolution, then that sex has attained the highest level of human evolution in which this retardation is most pronounced. And without doubt this is the case with the masculine sex. A very interesting subject for a special lecture! He who proclaims the inequality of the human races must proclaim the same for the sexes. Yet there is a striking difference. The superiority of the white race above the negro is caused by the greater *extensity* of the process of retardation, the superiority of the masculine sex is caused by a greater *intensity* of the same.

Relation of Endocrine Glands to General Retardation.

Finally, I will return to the principal problem of the present lecture and put the question: whether this general retardation, too, is in any way related to the agency of the endocrine system? That the rate of development generally is regulated by this system is sufficiently demonstrated by experimental researches of late years. Though these experiments are yet in an initial stage, we have already become acquainted with an endocrine organ, able to *accelerate* the development. This organ is the thyroid gland. I mention only the statement that feeding tadpoles with thyroid accelerates the metamorphosis of these animals. But, as far as I am aware, experimental investigations have not yet brought to light any element of the endocrine system able to retard the rate of development. I am convinced, however, that there must be such an inhibitory element in the human organism. And I have a strong belief that this is the pineal gland. This belief is based on the occurrence of well-known anomalous conditions. Every physician is acquainted with the very deplorable cases of so-called premature sexual development. This anomaly occurs in boys as well as in girls, but apparently more frequently in the latter. Several instances of this pathological condition, in which, for example, young girls of six or seven years become pregnant, are dealt with in literature. Now I believe these cases must be explained in this way, that in such individuals the arresting influence of the endocrine system on the function of the genital glands was insufficient, and the check which hindered the maturation of germ cells was removed too early. Considered from this point of view the premature sexual development appears as a physiological atavism. Observations of late years have shown conclusively what endocrine organ is responsible for this anomaly. You know it is the pineal gland. These observations justify my assertion that this organ is, and has been, the regulator of maturation and that it was principally by its agency that the general vital process of man was retarded.

Adaptation to Animal Food.

And now, in conclusion, only a single remark concerning the primary cause of this retardation. I consider this to be the adaptation of the human species to animal food. All other Primates are herbivorous or frugivorous, only man has accustomed himself to an omnivorous existence. This must thoroughly have changed his metabolism. The whole endocrine system functions as a unit. All its organs are physiologically associated with each other, and the effect of this association is an equilibrium. Now in each organism this equilibrium is in harmony with the chemical structure of the food, of the material which must be assimilated. If this material is exclusively or principally vegetable, the endocrine system must function in a somewhat different manner than when the material submitted to its regulating power is of animal origin. Therefore, by a transition from a vegetable to an omnivorous diet, the regulation of the metabolic processes must necessarily be modified. Is there any indication as to the nature of this modification? I think there is. I draw your attention to the very interesting fact that as a rule the development of carnivorous animals, mammals as well as birds, takes place at a slower rate than that of herbivorous ones. I consider this fact as an argument in favour of my assertion that the retardation of human development is in some way or other connected with the adaptation of man to animal food. I have not the slightest idea of the relation of cause and effect in this case; the question is more physio-chemical than morphological.

Conclusion.

I must finish. However much I may regret to be obliged to condense the treatment of my subject, I must come to a conclusion; and let me end with a general remark upon the endocrine system. There exists, as I have mentioned already, a close relation between all internal secreting glands; the whole endocrine system is an organic unit, it is a sort of controlling super-organisation in our somatic organism, an *imperium in imperio*. And this "imperium" fulfils its task in a stimulating or a suppressing manner. The endocrine glands are, so to say, the sense-organs of the autonomic system, sensitive only to chemical stimuli, as the sense-organs of the cerebro-medullar system to physical stimuli. These organs judge the quality and intensity of the chemical substances produced in the body, and regulate the nature and the quantity of the same by means of their hormones. And certainly it is not a mere chance that the principal organs of this system are derived from the epithelium of the foremost part of the alimentary tube. I believe that originally they controlled also the chemical nature of the food, before there were senses of smell and taste. By investigations and observations on the endocrine system during late years we have arrived at a very important point. It seems to me that we have reached a summit, and a large plain and wide perspectives lie open before us.

MEDICAL CONGRESS AT YVERDON.

A MEDICAL congress is being arranged for Oct. 8th and 9th to be held at Yverdon-les-Bains, which lies at the S.W. end of the Lake of Neuchâtel, 40 minutes by rail from Lausanne. The springs are of two kinds. One gives a supply of 12,000 litres an hour of a sulphur water, at a temperature of 21° C., analogous to that of Aix-les-Bains, Eaux Bonnes, or Cauterets. The other is a cold water containing $MgSO_4$. Both are used for inhalation as well as bathing, and among the special indications are mentioned arthritism, gout, obesity, diabetes, high arterial tension, plethora, and auto-intoxication. The season lasts from May until October.

AN EXAGGERATED REPORT.

UNDER this heading there appeared in our issue of June 11th, p. 1280, a démenti from our Geneva correspondent of the report current in the lay press that a certain surgeon had extracted a beating heart from a still living body. The accusations brought against this surgeon, who is none other than Prof. E. Kummer, by some of his junior colleagues at the university clinic, have formed the subject of a judicial inquiry nominated by the Conseil d'Etat. As regards the particular accusation referred to above, the court of inquiry find that the evidence refutes the "singularly hasty" reproach of homicide ("assassinat involontaire") which had been made. Prof. Kummer has emerged from the whole inquiry, whose scope was considerably greater than the clearing up of this one incident, with his reputation enhanced.

THE OLD "IMPREGNABLE."

THE old wooden battleship *Impregnable* has for so long figured as the least healthy of the boys' training ships that few will regret to see that she is to be broken up. She had 78 cases of pneumonia in 1913, 42 in 1914, 197 cases of mumps in 1913, 149 of measles in 1914, in each case the largest number shown by any ship in the training service. That they were not all attributable to this individual ship, but also to the sister ships associated with her, is doubtless true; still all old wooden ships are badly ventilated and likely to be overcrowded, and are consequently unsuitable for barracks. That another of them has gone from the Navy and may be replaced by a more modern ship gives hope for better health returns from the training establishment, in which *Impregnable* had a pneumonia incidence in 1913 ten times, and in 1914 five times as great as that of the general service.

ANOTHER CONSUMPTION CURE IN THE LAY PRESS.

WE have received a 12-page pamphlet containing extracts from several Queensland newspapers regarding a new specific treatment for tuberculosis stated by its inventor, Dr. De Luca, to be similar in principle to the Spahlinger cure. The exact nature of the remedy is not revealed, but it appears to be a tuberculo-protein administered as a vaccine, first by mouth and then subcutaneously. No clinical or pathological data have yet been given. Dr. De Luca is given in the Australian Medical Directory for 1914 as an M.D. of Naples, qualified in 1895, but he does not appear to have taken any registrable qualification in the country where he is now practising, or, at any rate, to have taken any steps for its registration. Nor has he communicated anything concerning his remedy to a medical society or a medical journal.

A NEW PROCEDURE IN OBSTETRICS.

UNDER the above title Dr. Lorenzo Diaz, of Toluca, Mexico,[1] describes how he treated a transverse presentation ("acromio-iliac right dorso-posterior") with prolapsed arm, in which the membranes had ruptured and all the amniotic fluid escaped before the patient was admitted to hospital. In the face of this difficulty Dr. Diaz took a large Nélaton catheter and inserted it behind the back of the fœtus (which was dead), and using the prolapsed arm to occlude the cervix he injected sterile water through the catheter from a 25 c.cm. glass syringe—sterile water was used because normal salt solution was not available. The result was in any case most happy; version was performed and the child safely delivered. The patient's temperature had fallen to normal two days after the operation, and she made an uneventful recovery.

THE name of the preparation "Chlorosan," made by the Institut Séro-Thérapique et Vaccinal of Berne, has been changed to "Phyllosan."

AN aged medical man's widow, nearly blind, is in want of a bath-chair. "A," 12, Park-lane, Tottenham.

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[1] Gaceta Medica Balear, July, 1921, vii., 9.